Plena Voice Alarm System

Security Systems

en

Installation and User Instructions Manual

Voice Alarm System

BOSCH

Important Safeguards

Prior to installing or operating this product, always read the Important Safety Instructions which are available as a separate document (9922 141 7014x).

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1 Introduction

1.1 Purpose

The purpose of the Installation and User Instructions Manual is to provide information required to install, configure, operate and maintain a Plena Voice Alarm System. A Plena voice alarm controller (system controller) forms the heart of a Plena Voice Alarm System. Unlike a *basic* system (see also the Basic System Manual, 9922 141 10361), a Plena Voice Alarm System may be configured, using all available units of the Plena product line, including one or more routers, call stations and call station extensions, to simultaneously serve and manage up to 60 loudspeaker zones.

A Plena Voice Alarm System can be extensively configured from a PC, running the Configuration Software. How to use this software is described in the Configuration Software Manual (9922 141 10381). In this manual the Plena Voice Alarm System is further referred to as “system”.

1.2 Digital document

This Installation and User Instructions Manual is also available as a digital document in the Adobe Portable Document Format (PDF). All references to pages, figures, tables, etc. in this digital document contain hyperlinks, to quickly consult the referenced location.

1.3 Intended audience

This Installation and User Instructions Manual is intended for installers and users of a Plena Voice Alarm System.

1.4 Related documentation

The following related documents are available:

- Basic System Manual (9922 144 10361).
- Configuration Software Manual (9922 144 10381).

1.5 Alerts

In this manual, four types of alerts are used. The alert type is closely related to the effect that may be caused when it is not observed. These alerts - from least severe effect to most severe effect - are:

- **Note**
  Alert containing additional information. Usually, not observing a note alert does not result in damage to the equipment or personal injuries.
- **Caution**
  The equipment can be damaged if the alert is not being observed.
- **Warning**
  Persons can be (severely) injured or the equipment can be seriously damaged if the alert is not being observed.
- **Danger**
  Not observing the alert can result in death.

In this manual, the following indicators are used for alerts:

Note
General sign for notes.

Note
Consult the indicated source of information.

Caution, Warning, Danger
General sign for cautions, warnings and dangers.

Caution, Warning, Danger
Risk of electric shock.

Caution, Warning, Danger
Risk of electrostatic discharges.

1.6 Conversion tables

In this manual, SI units are used to express lengths, masses, temperatures etcetera. Metric units can be converted to non-metric units using the information provided below.

table 1.1: Conversion of length units

1 in =	25.4 mm	1 mm =	0.03937 in
1 in =	2.54 cm	1 cm =	0.3937 in
1 ft =	0.3048 m	1 m =	3.281 ft
1 mi =	1.609 km	1 km =	0.622 mi

table 1.2: Conversion of mass units

1 lb =	0.4536 kg	1 kg =	2,2046 lb

table 1.3: Conversion of pressure units

1 psi =	68.95 hPa	1 hPa =	0.0145 psi

Note
1 hPa = 1 mbar.

table 1.4: Conversion of temperature units

$°F = \frac{9}{5} \cdot °C + 32$	$°C = \frac{5}{9} \cdot (°F - 32)$

2 Application examples

2.1 Introduction

In a Plena Voice Alarm System, any of the various units offered by the Plena product family, can be combined together, in order to satisfy with any of your specific configuration requirements. This chapter provides a number of examples, each describing a specific system configuration. You can use these examples and quickly adapt them to meet your own configuration requirements.

2.1.1 Plena

The Plena Voice Alarm System is part of the Plena product range. Plena provides public address solutions for places where people gather to work, worship, trade or simply enjoy themselves. It is a family of system elements that are combined to create public address systems tailored for virtually any application. The range includes mixer, pre-, system- and booster amplifiers, a source unit, digital message manager, feedback suppressor, call stations, an 'All-in-One' system and a voice alarm system. Each element is designed to complement all others thanks to matched acoustical, electrical and mechanical specifications.

2.1.2 Application areas

Typically, the Plena Voice Alarm System is used to create small systems that must comply witih emergency and evacuation standards, medium-sized systems in which one call channel is enough and large systems that consists of many small zones.

The application areas of a Plena Voice Alarm System include:

- Schools, see section 2.2.
- Swimming pools, see section 2.3.
- Shopping malls, see section 2.4.
- Hotels, see section 2.5.

Other areas include: factories, high-rise buildings, office buildings, recreational facilities and small airports.

2.2 Application: School

2.2.1 Introduction

Schools are typical example of applications with a large number of zones each with a relatively low output power requirement per zone. The main priorities are speech intelligibility and compliance with IEC60849 standard (or equivalent).

2.2.2 Requirements

In addition to mandatory voice alarm functionality for evacuating staff and students, Econtroller systems for schools should also include chime tones for notifying the start/finish of lessons, plus public address functionality for individually calling classrooms or public area. BGM is not essential. Since a classroom has a low ambient noise level, one loudspeaker is usually sufficient, keeping the total power requirement relatively low. Outside areas such as playgrounds and sports fields will require weatherproof horn loudspeakers.

table 2.1: Summary of requirements

Requirements
30 zones (typically 20 to 60 zones).
Speech intelligibility is the main priority.
Low power requirement (one loudspeaker) per classroom.
Fireman's panel by main entrance.
Call station in main office.
Additional public address functions such as chime tones desirable.
BGM in recreation areas is optional.

2.2.3 Solution

The Plena voice alarm controller handles message routing to 6 zones, the remaining 24 zones require four additional 6-zone routers. The office is equipped with a call station plus keypads for individually addressing zones, while a fireman's panel (with overall priority) is built in by the main entrance.

2.2.4 Power requirements

The voice alarm controller features a built-in 240 W booster amplifier, making it possible to drive up to 40 loudspeakers with a power handling capacity of 6 W each. This is sufficient for a medium-sized high school with 24 classrooms, four toilets/changing rooms, a staff

meeting room and two offices, each requiring a single loudspeaker. The canteen, assembly hall, playing fields and corridors typically require more loudspeakers per zone. An additional Plena booster amplifier is used as a spare amplifier.

table 2.2: Power requirements per zone

Zone	Description	Power
1-22	Classrooms	22x6W cabinet
23	Toilets	4x6W ceiling
24	Staff meeting room	1x6W cabinet
25-26	Offices	2x6W cabinet
27	Corridors	4x6W projector
28	Assembly hall	2x6W ceiling
29	Lunch canteen	2x6W ceiling
30	Playing fields	1x10W horn
	Total	232W

2.2.5 System configuration

The Plena units, needed to build the application, are listed in table 2.3. The interconnections are shown in figure 2.1.

table 2.3: Used Plena units

Unit	Description	Number
LBB1990/00	Voice alarm controller	1x
LBB1992/00	Router	4x
LBB1996/00	Remote control panel	1x
LBB1997/00	RCP extension	4x
LBB1956/00	Call station	1x
LBB1957/00	CS extension keypad	4x
LBB1935/00	240W booster	1x

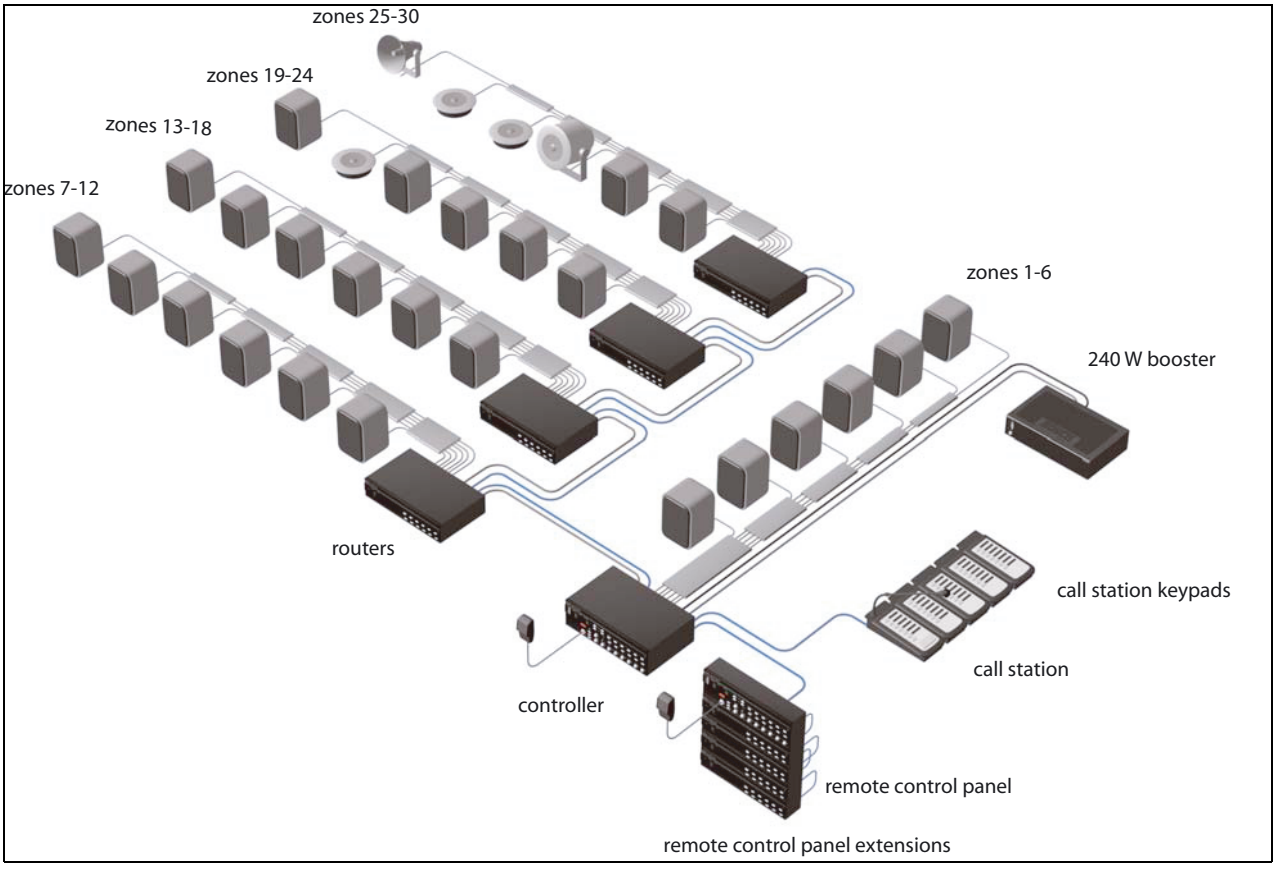

figure 2.1: Plena Voice Alarm System, application example: school

2.3 Application: Swimming pool

2.3.1 Introduction

Swimming pools and other indoor sports and recreational facilities are typical examples of smaller applications with few zones. The main priorities are excellent speech intelligibility and compliance with IEC60849 standard (and its national equivalents), although music in different areas is optional.

2.3.2 Requirements

An Econtroller system for a swimming pool requires voice alarm functionality with public address functionality for regular announcements and background music (optional). To ensure that all visitors in the relatively noisy pool area hear emergency messages, the power output for that zone is relatively high. Other areas, such as the changing rooms and offices, have lower power requirements.

table 2.4: Summary of requirements

Requirements
5 zones (typically up to 6 zones)
Speech intelligibility is the main priority
High power requirement in the noisy pool area
Fireman's panel by fire exit
Call station in office/reception
Additional public address functions for announcements
BGM

2.3.3 Solution

The Plena voice alarm controller handles routing to up to 6 zones, so no additional routers are required. The office/reception is equipped with a call station plus keypad for individually addressing zones, while a fireman's panel (with overall priority) is built in by the emergency exit. The Plena voice alarm system is a two-channel system, so BGM can still be provided in zones not receiving a call.

2.3.4 Power requirements

The voice alarm controller has a built-in 240 W booster amplifier, making it possible to drive up to 40 loudspeakers with a power handling capacity of 6 W each. The pool area requires highpower music horn loudspeakers qualified for use in a high humidity atmosphere. The snack bar uses cabinet loudspeakers for music reproduction. The zones are defined as indicated in the table. An additional Plena booster amplifier is used for two-channel operation and as a spare amplifier.

table 2.5: Power requirements per zone

Zone	Description	Power
1	Indoor pool area	5x30W horn
2	Children's pool area	2x10W horn
3	Changing rooms	4x6W ceiling
4	Snack bar	4x6W cabinet
5	Office	2x6W cabinet
	Total	230W

2.3.5 System configuration

The Plena units, needed to build the application, are listed in table 2.6. The interconnections are shown in figure 2.2.

table 2.6: Used Plena units

Unit	Description	Number
LBB1990/00	Voice alarm controller	1x
LBB1996/00	Remote control panel	1x
LBB1956/00	Call station	1x
LBB1957/00	CS extension keypad	1x
LBB1935/00	240W booster	1x
LBB1961/00	BGM source	1x

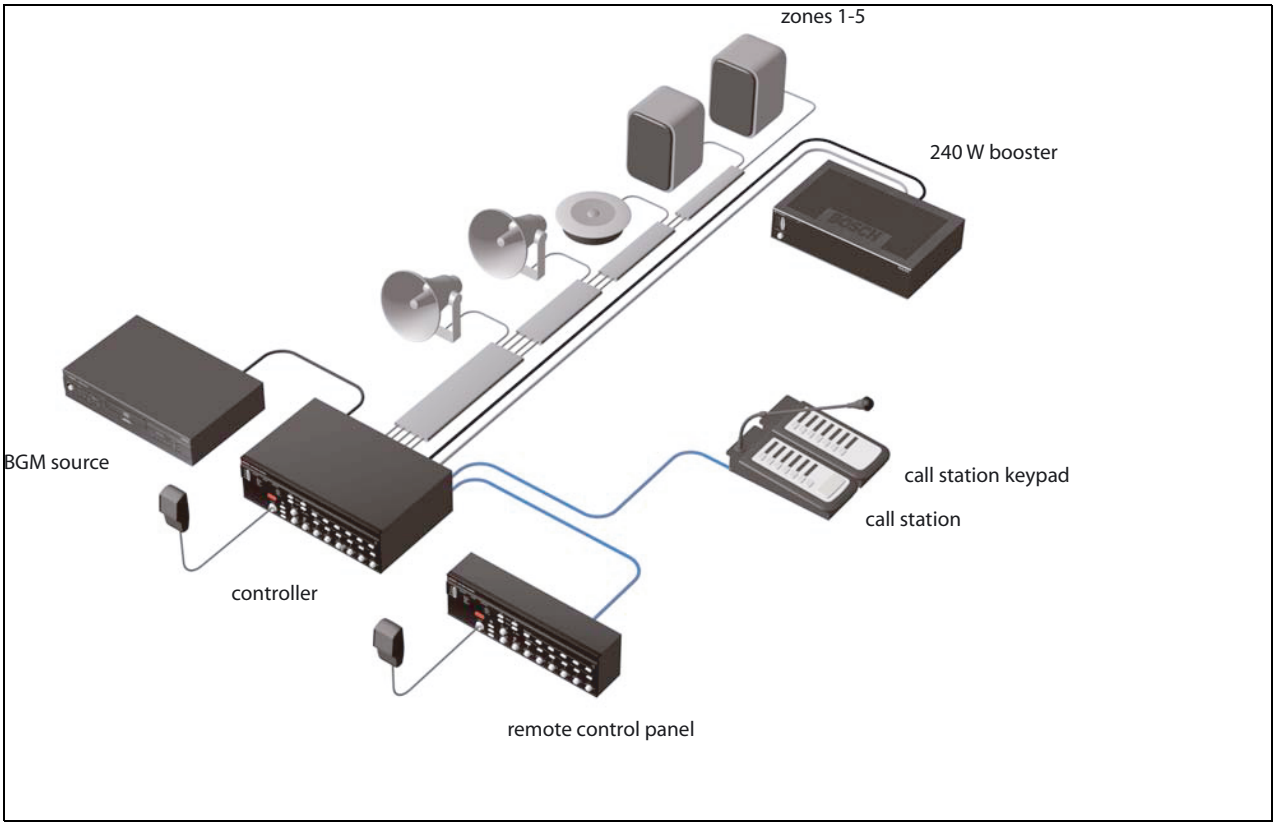

figure 2.2: Plena Voice Alarm System, application example: swimming pool

2.4 Application: Shopping mall

2.4.1 Introduction

Shopping malls are typical example of applications with a large number of zones with varying output power requirements per zone. The priorities are speech intelligibility and compliance with IEC60849 standard (and its national equivalents).

2.4.2 Requirements

In addition to mandatory voice alarm functionality for evacuating the public and shop personnel, an Econtroller system for shopping centers can have BGM for the public areas. It should be possible to individually call each shop or store. During emergency messages, the volume override of each individual shop is engaged. Additional public address functionality for making general public announcements is an optional requirement.

table 2.7: Summary of requirements

Requirements
54 zones (typically up to 60 zones)
Speech intelligibility is the main priority
Variable power requirement per zone
Call station in security control room
Additional public address functionality (nonemergency)
BGM in public areas
BGM music with local override in shops

2.4.3 Solution

A Plena voice alarm controller handles routing to 6 zones, the remaining 48 zones require eight 6-zone routers. The security control room is equipped with a remote control panel and call station plus keypads for individually addressing zones and BGM for the public areas, while the controller unit and routers are located in a fire-resistant cabinet or basement. Fireman's panel (with overall priority) is built in close to the main entrance or emergency exit (subject to relevant local regulations). The Plena voice alarm system is a two-channel system, so BGM can still be provided in zones not receiving a call.

2.4.4 Power requirements

Each zone will have varying power requirements, ranging from small shops with a single loudspeaker to department stores with several floors and more loudspeakers. Parking garages and open-air walkways will require weatherproof sound projectors or horn loudspeakers. To facilitate phased evacuation from different levels of the shopping center, public areas are divided into zones. Additional Plena booster amplifiers are incorporated to provide additional power, two-channel operation and for use as a spare amplifier.

table 2.8: Power requirements per zone

Zone	Description	Power
1-30	30 small shops	30x6W cab/ceil
31-36	6 small shops	12x6W 2/store
37-42	6 medium stores	24x6W ceiling
43-46	Large store, 4 levels	16x6W ceiling
47	Control room	1x6W cabinet
48	Offices	4x6W cabinet
49	Walkways gnd floor	4x6W projector
50	Gallery 1st floor	10x6W ceiling
51	Gallery 2nd floor	10x6W ceiling
52	Main public square	4x18W horn
53	Parking level 1	6x10W horn
54	Parking level 2	6x10W horn
	Total	858W

2.4.5 System configuration

The Plena units, needed to build the application, are listed in table 2.9. The interconnections are shown in figure 2.3.

table 2.9: Used Plena units

Unit	Description	Number
LBB1990/00	Voice alarm controller	1x
LBB1992/00	Router	8x
LBB1996/00	Remote control panel	1x
LBB1997/00	RCP extension	8x
LBB1998/00	RCP kit	1x
LBB1999/00	RCP extension kit	8x
LBB1956/00	Call station	1x
LBB1957/00	CS extension keypad	5x
LBB1935/00	240W booster	3x
LBB1938/00	480 booster	2x
LBB1961/00	BGM source	1x

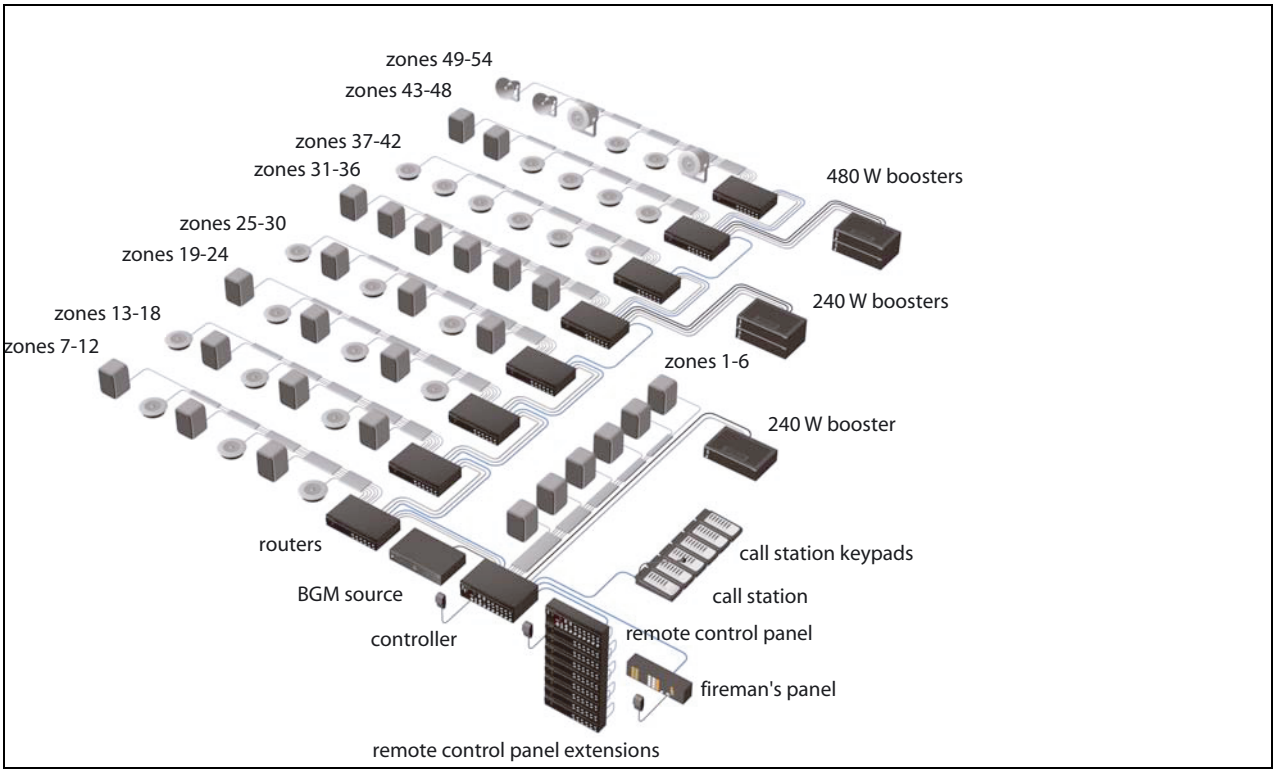

figure 2.3: Plena Voice Alarm System, application example: shopping mall

2.4.6 Uplink to Preasideo

In large voice alarm system configurations, as in big shopping malls, it is possible to have a Plena system integrated with a Preasideo system. An uplink from a Plena system to a Preasideo system can be established by interconnecting a Preasideo audio output with the Plena mic/line input with VOX functionality. Emergency calls issued from the Preasideo system, are then broadcast on the Plena system. For this purpose the Plena mic/line input with VOX functionality should be assigned the highest possible priority level (14).

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about configuring priority levels.

2.5 Application: Hotel

2.5.1 Introduction

Smaller hotels are typical examples of applications with relatively few zones, each with a medium to high output power requirement. The priorities are speech intelligibility and compliance with IEC60849 standard.

2.5.2 Requirements

In addition to mandatory voice alarm functionality for evacuating guests and staff, an Econtroller system for a hotel should also include BGM in the restaurant, bar and lobby, plus public address functionality for general paging. To ensure that all guests hear an emergency message, the power output per zone is relatively high. Outside areas such as car parking garages, require weatherproof horn loudspeakers.

table 2.10: Summary of requirements

Requirements
12 zones (typically 10 to 20 zones in small hotels)
Speech intelligibility is the main priority
High power requirement (multiple loudspeakers) per floor
Fireman's panel by fire exit
Call stations in reception and office
Additional public address functions for paging guests
BGM in lobby and restaurant

2.5.3 Solution

A Plena voice alarm controller handles routing to up to 6 zones, the additional 6 zones require a router. Both the reception and office are equipped with call stations plus keypads for individually addressing zones, while a fireman's panel (with overall priority) is built in by the emergency exit. The Plena Voice Alarm System is a two-channel system, so BGM can still be provided in zones not receiving a call.

2.5.4 Power requirements

The system controller features a built-in 240 W booster amplifier, able to drive up to 40 loudspeakers (6 W). Additional Plena booster amplifiers are incorporated to provide additional power, two-channel operation and spare amplification. To facilitate phased evacuation from different floors of the hotel, guest areas are divided into separate zones, each fitted with 13 ceiling loudspeakers in the corridors. The bar uses cabinet loudspeakers, while the parking garage uses weatherproof horn loudspeakers. The zones are defined as shown in the table opposite.

table 2.11: Power requirements per zone

Zone	Description	Power
1	Bar	3x6W cabinet
2	Restaurant	6x6W ceiling
3	Lobby	2x6W ceiling
4	Office	1x6W cabinet
5	Kitchens	2x6W cabinet
6	Parking garage	3x10W horn
7-12	Floors 1 to 6	78x6W ceiling
	Total	582W

2.5.5 System configuration

The Plena units, needed to build the application, are listed in table 2.12. The interconnections are shown in figure 2.4.

table 2.12: Used Plena units

Unit	Description	Number
LBB1990/00	Voice alarm controller	1x
LBB1992/00	Router	1x
LBB1996/00	Remote control panel	1x
LBB1997/00	RCP extension	1x
LBB1956/00	Call station	2x
LBB1957/00	CS extension keypad	3x
LBB1938/00	480 booster	2x
LBB1935/00	240W booster	1x
LBB1961/00	BGM source	1x

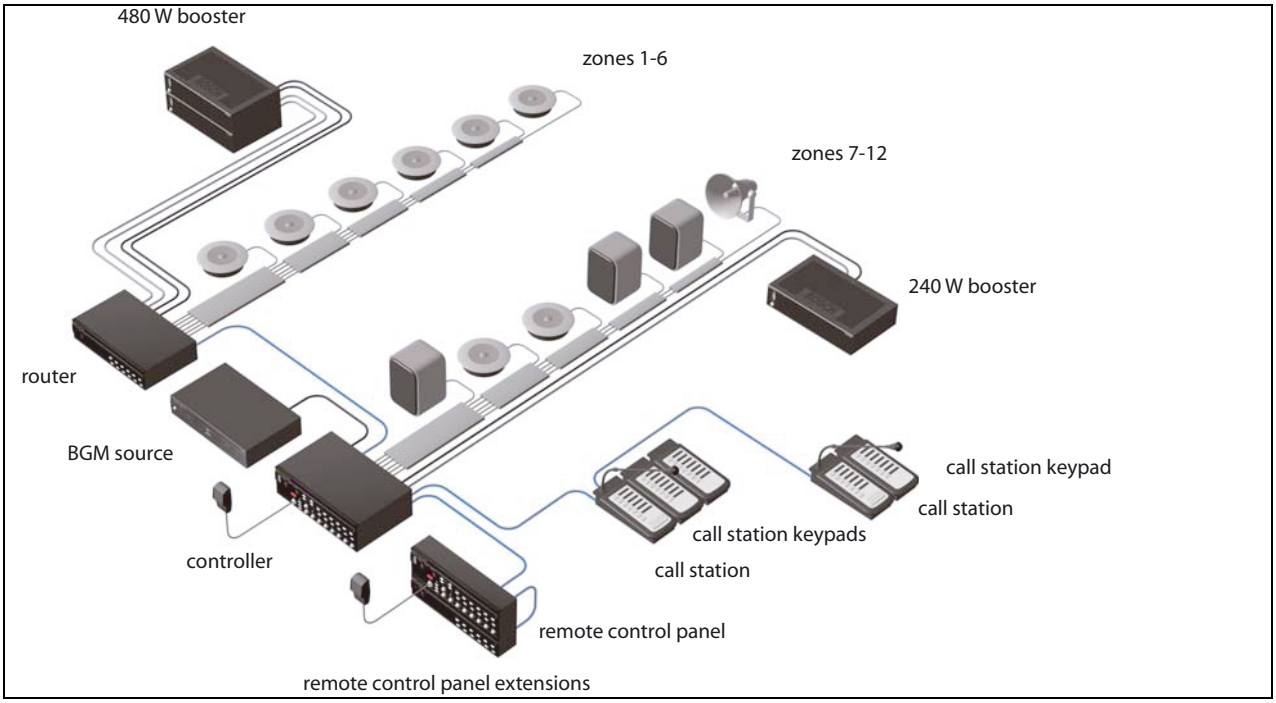

figure 2.4: Plena Voice Alarm System, application example: hotel

3 System units

3.1 Introduction

The Plena product family comprises various units that can be used to configure a Plena Voice Alarm System, to meet your specific configuration requirements. This chapter first describes the functionality of each of the Plena units and explains their usage. Further on in this chapter, for each of the units, an overview is provided of the connectors, controls and indicators.

3.2 Voice alarm controller

The voice alarm controller (LBB1990/00) is the heart of the Plena Voice Alarm System. The voice alarm controller (further referred to as “controller”) centrally manages and distributes emergency calls, business calls and background music (BMG). A single controller is able to serve and manage 6 loudspeaker zones. If more zones are to be served, extra routers can be connected (see section 3.3). Like this, up to a maximum of 60 zones can be served. The controller is equipped with an internal booster (see section 3.2.4) and an integrated message manager (see section 3.2.5). All Plena units to be used, can be connected to the central controller.

figure 3.1: Voice alarm controller (LBB1990/00)

3.2.1 Trigger inputs

The rearside of the controller provides a terminal block for the connection of 6 EMG and 6 business trigger inputs. The EMG trigger inputs have a higher priority in being served, than the business trigger inputs. The trigger inputs can be used to signal events to the controller. To each trigger input, a prerecorded message can be assigned and broadcast to one or more zones or zonegroups.

Note
Refer to the Configuration Software Manual (9922 141 10381) to configure the trigger inputs.

To connect the trigger inputs, refer to section 4.7.

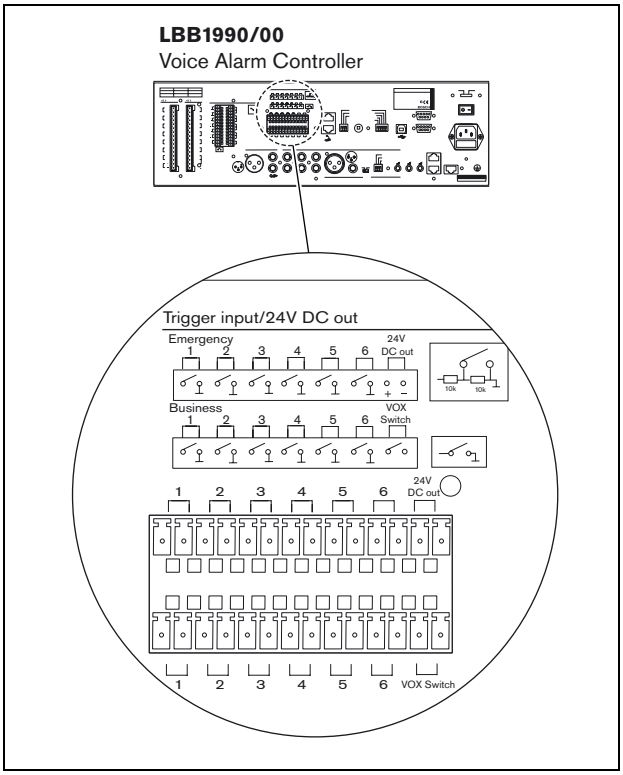

figure 3.2: Trigger inputs

3.2.2 Loudspeaker zones

The controller can serve 6 loudspeaker zones. In compliance with IEC60849, the supply to each zone is redundantly designed. For this purpose, on the rearside of the controller, there are two zone output terminal blocks (A and B). To connect the zone outputs, refer to section 4.8.

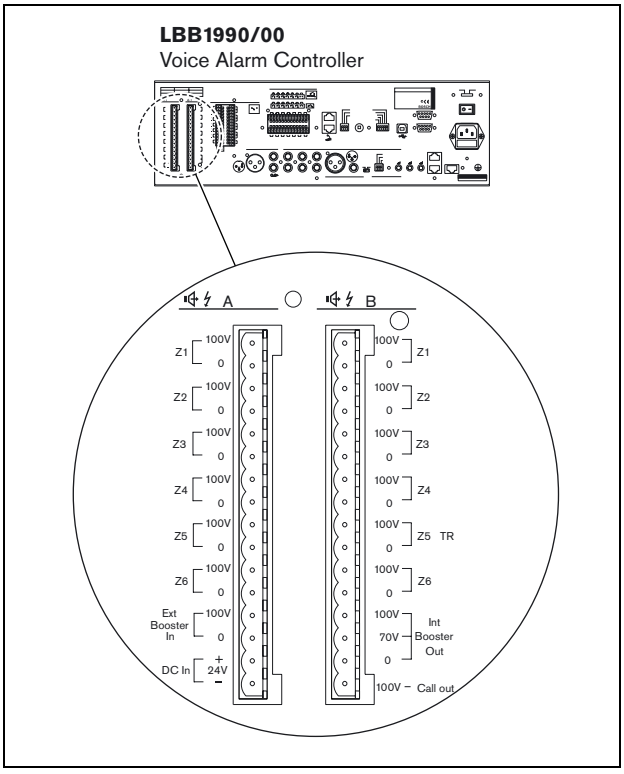

figure 3.3: Zone output terminal blocks

3.2.3 Hand-held EMG microphone

The controller is equipped with a hand-held EMG microphone, which can be used to make emergency calls. To be able to make business calls, one or more call stations (LBB1956/00) must be connected to the controller (see section 3.4).

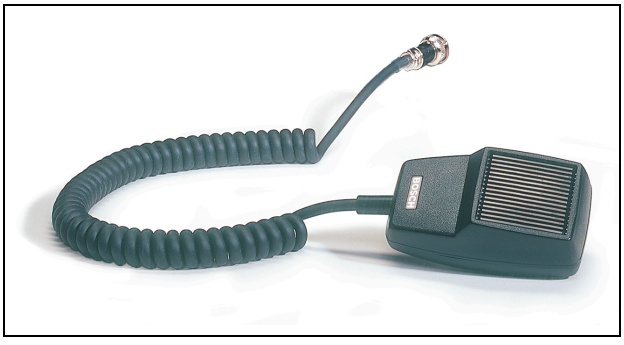

figure 3.4: Hand-held EMG microphone

3.2.4 Internal booster

The controller is equipped with a 240 W internal booster, which can be used in 1-channel or 2-channel mode:

- In 1-channel mode, the *internal booster* amplifies calls and BGM. In 1-channel mode, calls will interrupt the BGM. Optionally, a spare external booster can be connected (see also section 3.3.2). The external booster will only be activated when the internal booster fails.
- In 2-channel mode, an *external booster* (see also section 3.3.2) must be connected to the controller. The internal booster of the controller amplifies the BGM and the external booster amplifies the calls. In 2-channel mode, calls do not interrupt the BGM.

If one or more routers (see also section 3.3) are connected to the controller, to each router, two additional external boosters can be connected. See also section 3.3.2.

3.2.5 Internal message manager

The controller has an internal message manager, which manages and distributes all prerecorded messages and chimes. Up to 255 prerecorded messages can be stored as wave files (*.wav*) in an EEPROM, and can be used both in emergency and in business calls. Wave files can be created and uploaded to the message manager, from a PC running the Configuration Software.

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about creating prerecorded messages for the message manager.

3.2.6 Supervision

The controller integrates all required supervision features, in accordance with the international standard IEC60849 applicable for emergency systems. Various functions of the controller are supervised. Supervision is switched ON by default. Supervision can be switched OFF by setting the supervision DIP switch in the OFF position (see section 5.3). If supervision is enabled, any failing function will cause the controller to enter the fault state and the corresponding fault indicator is turned ON (see also section 7.2).

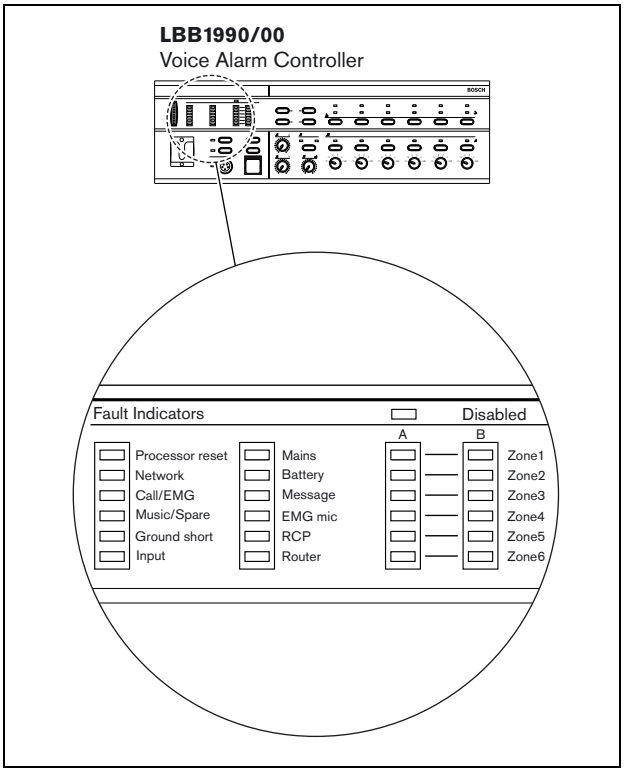

figure 3.5: Fault indicator LEDs

3.3 Router

A single controller can serve and manage 6 loudspeaker zones. To extend the number of zones, one or more routers (LBB1992/00) can be connected. In total, 6 extra routers can be connected to a controller, each adding 6 extra loudspeaker zones. As a consequence, in its maximum configuration, a Plena Voice Alarm System can simultaneously serve and manage up to 60 loudspeaker zones. If the power supplied by the controller is not sufficient, two additional external boosters can be connected to each router (see also section 3.3.2).

figure 3.6: Router (LBB1992/00)

3.3.1 Trigger inputs

In addition to the trigger inputs supplied by the controller, each router adds 6 extra EMG and business trigger inputs to the Plena Voice Alarm System.

Note
Refer to the Configuration Software Manual (9922 141 10381) to configure the trigger inputs.

To connect the trigger inputs, refer to section 4.7.

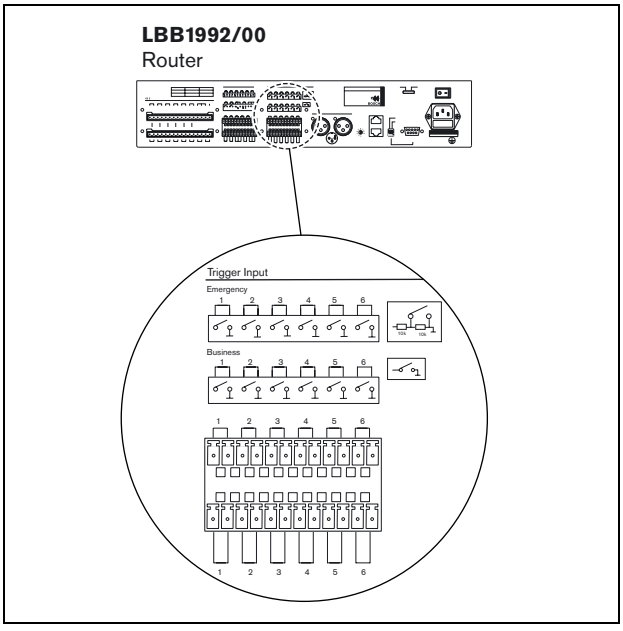

figure 3.7: Trigger inputs

3.3.2 External boosters

A router does not have an internal booster. If the power, supplied by the controller, is not sufficient, two additional external boosters (1 and 2) can be connected to a router. Multiple boosters can be connected to amplify calls and BGM or just to serve as backup boosters. The function of a booster depends on the mode for which the controller is configured:

- In 1-channel mode, external booster 1 is additional to the controller's internal booster (see section 3.2.4) to amplify calls and BGM.
- In 2-channel mode, external booster 2 is additional to the controller's external booster (see section 3.2.4) to amplify calls.

To connect external boosters, see section 4.15.3.2.

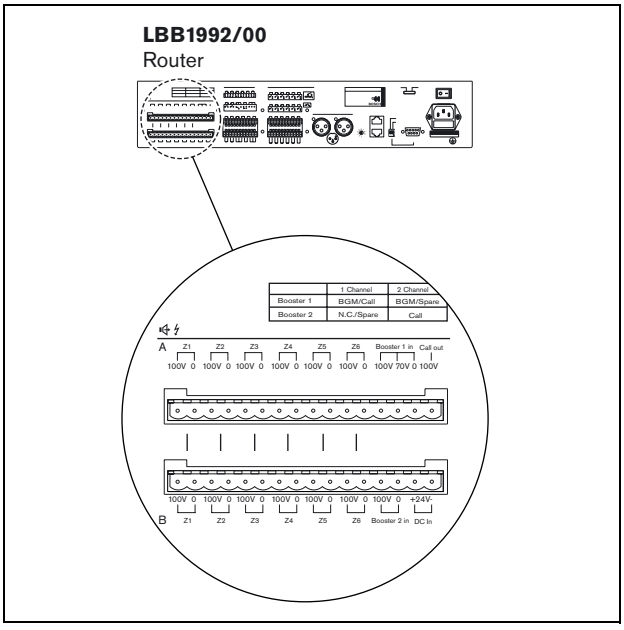

figure 3.8: External boosters

3.4 Call station

In total 8 call stations (LBB1956/00) can be connected to the controller for making business calls. The rearside of the controller provides two RJ45 connectors for the connection of the call stations. To connect call stations, refer to section 4.14.

figure 3.9: Plena call station (LBB1956/00)

A call station has 6 Zone Select buttons, one All Call button and a PTT button. The Zone Select buttons can be configured, for selecting zones or zone groups within the system. The PTT (Push To Talk) button can be assigned a pre- and/or a post-chime. Each call station can be assigned a priority level between 1 - 6. If a Plena Voice Alarm System serves more than 6 zones, it is possible to connect one or more call station extension keypads to a call station (see section 3.4.1).

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about configuring a call station.

In accordance with IEC60849, the controller disables all call stations during an emergency call (see section 6.7) or an active emergency trigger (see section 4.7.1). A call station is not supervised.

3.4.1 Extension keypad

Each router (see section 3.3) that is connected to a controller, adds 6 extra zones. To be able to select all these extra zones from a call station, it is possible to connect at maximum 8 extension keypads (LBB1957/00) to a call station. Each call station extension keypad provides 7 extra *Zone select* buttons, for selecting zones or zone groups within the system. A call station automatically detects how many keypads are connected. To connect extension keypads, see section 4.14.1.

figure 3.10: Extension keypad (LBB1957/00)

The buttons of a call station extension keypad can be configured using the Configuration Software.

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about configuring a call station keypad.

3.5 Controls, connections and indicators

3.5.1 Voice alarm controller

See figure 3.11 for an overview of the controls, connections and indicators on the voice alarm controller (LBB1990/00):

1 **Power LED/VU Meter** - A combined power indicator and VU meter. The green power LED is lit if the voice alarm controller is connected to the mains or back-up power and switched on. The VU meter indicates the master VU level: 0 dB (red), - 6 dB, -20 dB (yellow).

2 **Fault indicators** - Twelve yellow system fault LEDs (*Processor reset*, *Network*, *Call/EMG*, *Music/Spare*, *Ground short*, *Input*, *Mains*, *Battery*, *Message, EMG mic*, *RCP* and *Router*) and twelve yellow loudspeaker line fault LEDs. Fault indication is only possible if supervision is enabled (see section 5.7). If supervision is disabled, the yellow *Disabled* LED is lit.

3 **Fault state keys** - Two keys to acknowledge (*Ack*) and reset (*Reset*) the fault state (see section 5.7).

4 **Emergency state keys** - Two keys to acknowledge (*Ack*) and reset (*Reset*) the emergency state (see section 5.6).

5 **Emergency call zone selectors** - Six keys to select the zones to which the emergency call must be distributed (see section 5.6). Each button has a green and a red LED. The six red LEDs indicate the zones that are selected for the emergency call. The six green LEDs indicate the zones in which a business call is running (see section 5.6).

6 **BGM zone selectors** - Six keys to select the zones to which the BGM is distributed (see section 5.4). Each button has a green LED and a rotary knob. The six green LEDs indicate the zones to which BGM is distributed. The six rotary knobs are local volume controls that can be used to adjust the volume of the BGM in each zone.

7 **BGM master volume control** - A rotary knob to set the master volume of the BGM (see section 5.4).

8 **BGM source selector** - A button to select the BGM source (*CD/Tuner* or *Aux*). The selected source is indicated with a green LED (see section 5.4).

9 **BGM tone controls** - Two rotary knobs to control the high and low frequencies of the BGM (see section 5.6).

10 **All call button**- A button to select all zones. This button is only available in the emergency state (see section 5.6).

11 **Indicator test button** - A button to test all LEDs on the front panel of the voice alarm controller. All LEDs are lit as long as the button is pressed (see section 5.7).

12 **Emergency button** - A push button to put the system in the emergency state (see section 5.6).

13 **Alert message button** - A button to select the alert message. This button is only available in the emergency state (see section 5.6).

14 **Alarm message button** - A button to select the default alarm message. This button is only available in the emergency state (see section 5.6).

15 **Microphone socket** - A socket to connect the hand-held emergency microphone (see section 3.6).

16 **Bracket** - A bracket for the hand-held emergency microphone that is supplied with the voice alarm controller.

17 **Monitoring speaker** - Built-in monitoring speaker.

18 **Zone outputs** - Six zone outputs to connect loudspeakers to the voice alarm controller. Each zone output consists of two loudspeaker line outputs (see section 3.10).

19 **Override outputs** - Six volume override outputs to override local volume controls in each zone (see section 3.11).

20 **Status outputs** - Three status outputs to send the status of the Plena Voice Alarm System to third party equipment (see section 3.14).

21 **Trigger inputs/24 V DC input** - Twelve trigger inputs to receive signals from third party equipment and one 24 V(DC) output. Except for the *VOX switch* input and the *24V DC out* output, these must be configured with the configuration software and are therefore not used in basic systems (see section 3.13).

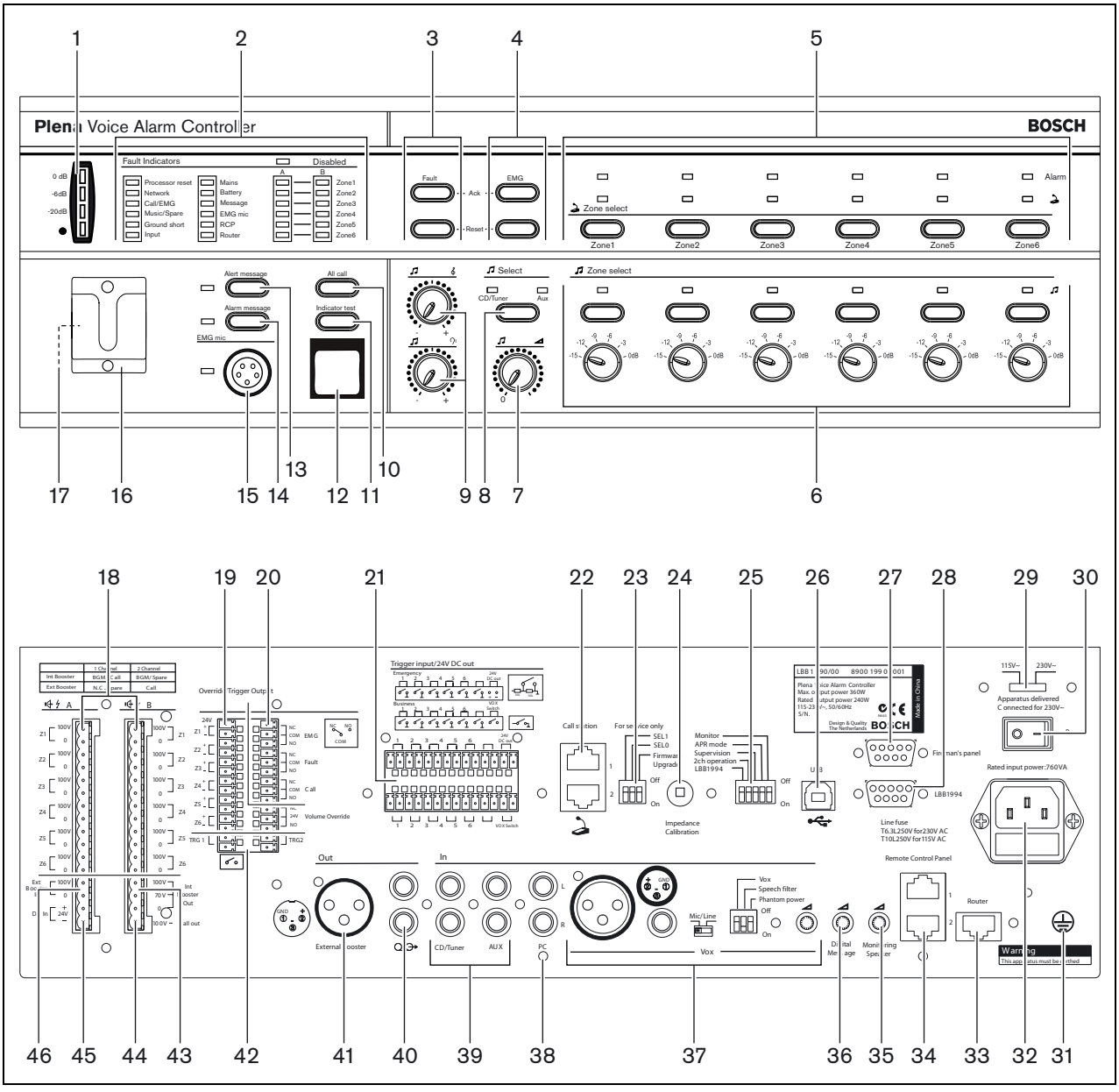

figure 3.11: Front and rear views of the voice alarm controller

22 **Call station sockets** - Two redundant RJ45 sockets to connect call stations (LBB1956/00) to the voice alarm controller (see section 3.8).

23 **Service settings** - A set of DIP switches to service the voice alarm controller. Do not change the positions of the switches.

24 **Calibration switch** - A switch to calibrate the impedances of the loudspeaker lines for loudspeaker supervision (see section 4.5.5.3).

25 **Configuration settings** - A set of DIP switches to configure the voice alarm controller (see section 4.2).

26 **PC socket** - A USB socket to connect the voice alarm controller to a PC. Not for use in basic systems.

27 **Fireman's panel port** - An RS232 port to connect a fireman's panel to the voice alarm controller. Not for use in basic systems.

28 **LBB1994 port** - Reserved.

29 **Voltage selector** - A voltage selector to select the local mains voltage (see section 3.15).

30 **Power switch** - A switch to switch the voice alarm controller on and off (see section 5.1).

31 **Ground** - A connection to electrically ground the voice alarm controller.
32 **Mains power inlet** - A socket to connect the voice alarm controller to the mains power (see section 3.15).
33 **Router socket** - An RJ45 socket to connect voice alarm routers (LBB1992/00) to the voice alarm controller. Not for use in basic systems.
34 **Remote control panel socket** - Two redundant RJ45 sockets to connect remote control panels (LBB1996/00, LBB1998/00) to the voice alarm controller. Not for use in basic systems.
35 **Monitoring speaker volume control** - A rotary knob to set the volume of the monitoring loudspeaker.
36 **Digital message volume control** - A rotary knob to set the volume of the digital business messages. This volume control does not influence the volume of the emergency messages.
37 **Mic/line input with VOX functionality** - An XLR socket and a 6.3 mm jack with voice-activated (VOX) functionality to connect a microphone or line input to the voice alarm controller (see section 3.13). The VOX settings are configured with the DIP switches and the source selector switch (see section 4.6).
38 **PC Call station input** - An input to connect a PC call station. Not for use in basic systems.
39 **BGM inputs** - Two inputs to connect background music sources. Each input consists of two cinch sockets (see section 3.7).
40 **Line output** - A line output to connect an external recording device to record the audio of the Plena Voice Alarm System (see section 3.12).
41 **External booster (output)** - An XLR socket to connect an external booster (see section 3.9). This socket is used in combination with the external booster input (no. 42).
42 **Trigger outputs** - Two general purpose trigger outputs. Not for use in basic systems.
43 **Internal booster output** - Three pins that provide the 100 V audio signal of the internal booster of the voice alarm controller.
44 **Call output** - An output that provide the call audio of the Plena Voice Alarm System.
45 **Back-up power inlet** - An inlet to connect a back-up power supply to the voice alarm controller (see section 3.15).
46 **External booster (input)** - An input to connect an external booster (see section 3.9). These pins are used in combination with the external booster output (no. 38).

3.5.2 Router

See figure 3.12 for an overview of the controls, indicators and connectors of the LBB1952/00 Router:

1 **Power LED/VU Meter** - A combined power indicator and VU meter. The green power LED is turned ON if the controller is switched on. The VU meter indicates the master VU level: 0 dB (red), - 6 dB, -20 dB (yellow).
2 **Fault indicators** - Eight yellow system fault indicator LEDs (*Processor reset*, *Network*, *Call/EMG*, *Music/Spare*, *Ground short*, *Input*, *Mains*, *Battery*) and twelve yellow line fault indicator LEDs.
3 **EMG call zone controls** - Six buttons to select the zones to which an emergency call must be distributed (see section 6.7). Each button has a green and a red LED. The six red LEDs indicate the zones that are selected for the emergency call. The six green LEDs indicate the zones in which a business call is running (see section 6.5).
4 **BGM zone controls** - Six buttons to select the zones to which BGM is to be distributed (see section 6.4). Each zone has a green LED to indicate that the zone is selected.
5 **Zone outputs** - Six zone outputs to connect loudspeakers to the router. The loudspeaker lines to each zone are redundantly designed (A and B) (see section 4.8).
6 **External booster 1 input** - Three pins to connect external booster 1 (70V/100V). These pins are used in combination with the XLR socket *Booster 1 Out* (no. 18).
7 **Call out** - An output that provides the call audio of the system.
8 **Override outputs** - Six volume override outputs to override local volume controls in each zone (see section 4.9).
9 **Trigger inputs** - Twelve trigger input contacts to receive signals from third party equipment (see section 4.7).
10 **Voltage selector** - A voltage selector to select the local mains voltage (see section 4.15).
11 **Power switch** - A switch to switch the power to the router ON or OFF (see section 6.1).

12 **Mains power inlet** - A socket to connect the mains power source to the router (see section 4.15).
13 **Ground** - A connection to electrically ground the router.
14 **Firmware upgrade connector** - An RS232 connector to connect a PC to upgrade the firmware of the router.
15 **Configuration settings** - Two DIP switches to configure the router. A termination switch to identify the last router in a row and a firmware upgrade switch to enable firmware upgrading.

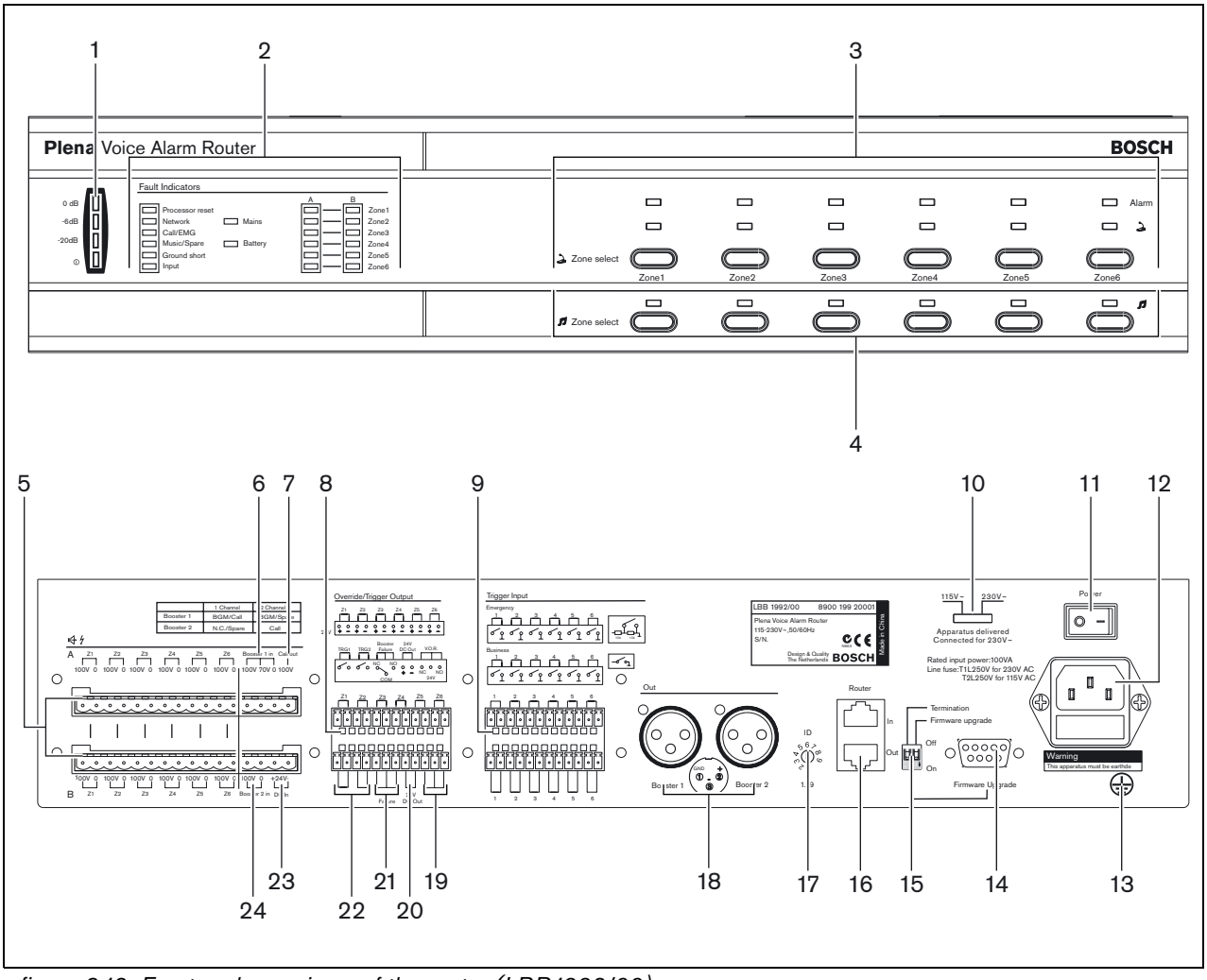

figure 3.12: Front and rear views of the router (LBB1992/00)

16 **Router connector** - Two RJ45 connectors to connect a controller or another router (see section 4.6).
17 **Router ID** - A rotary switch to set the ID of the router (see section 5.6).
18 **External booster 1 and 2 outputs** - Two XLR sockets to connect external booster 1 and 2 (see section 4.15.3). These socket are respectively used in combination with the *Ext booster 1/2 in* pins (no. 6 and 24).
19 **???** -
20 **24V DC output** -
21 **Booster failure** - Two pins (NC relays) to report a booster failure.
22 **TRG1/2** - Two general purpose trigger outputs.
23 **Backup power inlet** - An inlet to connect a back-up power supply to the router (see section 4.15.2).
24 **External booster 2 input** - Two input pins to connect external booster 2 (70V/100V). These pins are used in combination with the XLR socket *Booster 2 Out* (no. 18).

3.5.3 Call station

See figure 3.13 for an overview of the controls, indicators and connectors of the LBB1956/00 Call Station:

1 **Power indicator** - A green LED to indicate that the call station is powered on.

2 **Zone selection keys** - Six keys to select the zones to which the business call is distributed (see section 6.5). Each button has a green LED, which indicates the zones to which the business call is distributed.

3 **'All call' selector** - A button to select all zones (see section 6.5).

4 **Press-to-talk button** - A Press-to-talk (PTT) button to start the business call.

5 **Status indicators** - Three LEDs that indicate the status of the call station (see section 6.5).

6 **Keypad connector** - A connector to connect call station keypads (LBB1957/00) to the call station.

7 **Configuration settings** - A set of DIP switches to configure the call station (see section 5.5).

8 **Power supply inlet** - A socket to connect a 24 V(DC) power supply (see section 4.14).

9 **System sockets** - Two redundant RJ45 sockets to connect the call station to the voice alarm controller (LBB1990/00, see section 4.14).

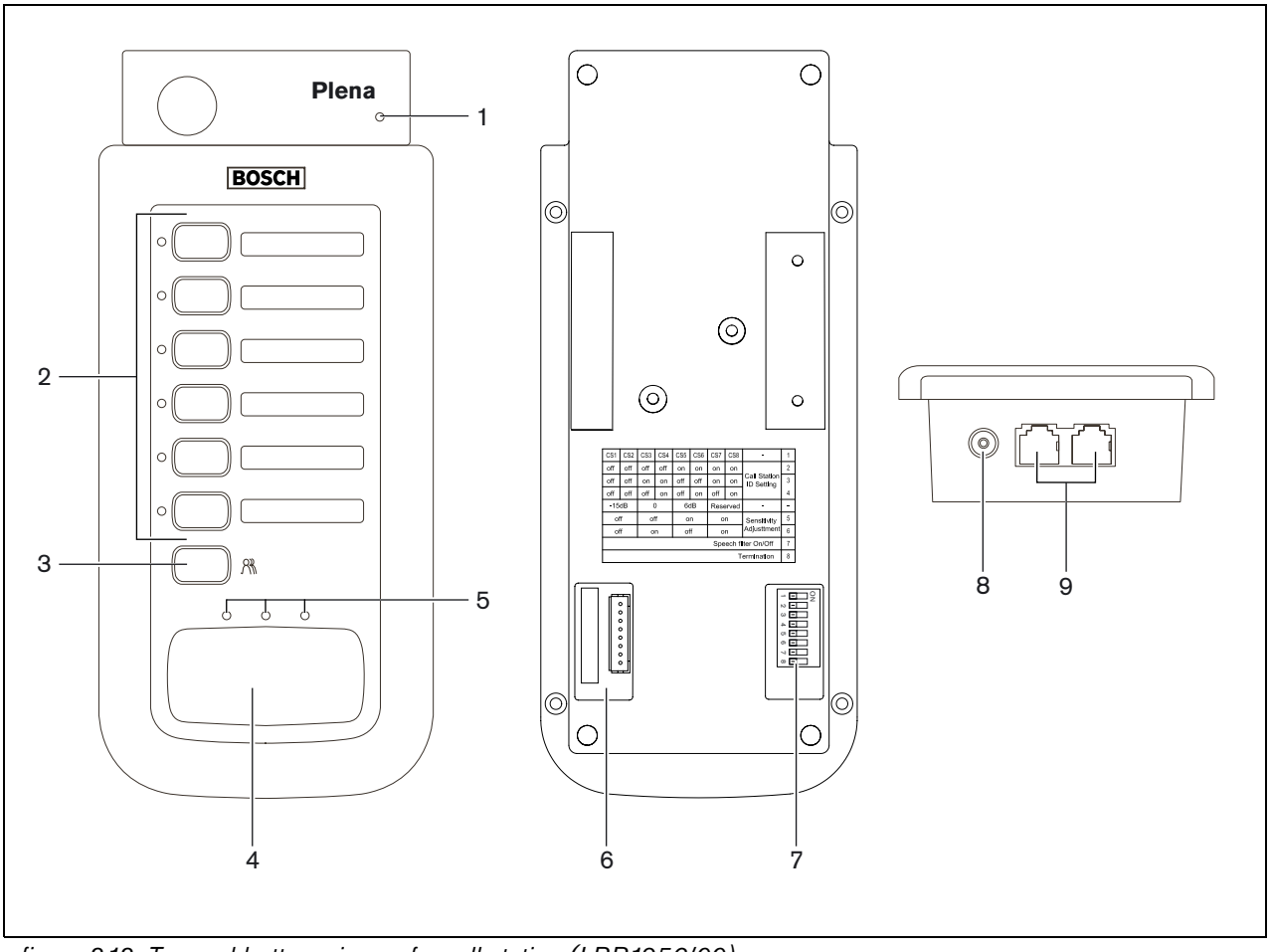

figure 3.13: Top and bottom views of a call station (LBB1956/00)

4 Installation

4.1 Introduction

The Plena Voice Alarm System is designed for plug-and-play installation and can be easily configured using DIP-switches. For more advanced configuration settings, a PC running the Configuration Software should be used. Once configured, the PC can be disconnected.

Note
Throughout this chapter, whenever a software configurable function is described, a reference is made to the Configuration Software Manual (9922 141 10381) .

This chapter describes, step by step, the installation procedure.In order to properly install your Plena Voice Alarm System, respectively, follow the next steps:

- Check the environmental, electrical and physical requirements of the installation site (see section 4.2).
- Unpack the equipment (see section 4.3).
- Mount the Plena units (see section 4.5)
- Connect the loudspeakers for the various loudspeaker zones (see section 4.8).
- Connect the volume overrides (see section 4.9).
- Connect the audio sources: background music (BGM) and the mic/line input with voice-activated (VOX) functionality (see section 4.10).
- Connect the trigger outputs (see section 4.12).
- Connect the emergency (EMG) microphone (see section 4.13).
- Connect the emergency and business trigger inputs (see section 4.7).
- Connect one or more routers (see section 4.6).
- Connect mains power, back-up power and external boosters (see section 4.15).
- Connect call stations and call station keypads (see section 4.14).

4.2 Requirements

Before installing the Plena Voice Alarm System, check, for each Plena unit, if the environmental, electrical and physical characteristics of the installation site, meet the technical specifications that are listed in chapter 8.

4.3 Unpacking

The equipment for your Plena Voice Alarm System is shipped in cardboard boxes. For the contents of these boxes, see table 4.1 and table 4.2.

Note
Always check if the contents of a shipment match the listed parts on the shipment documents.

Caution
To protect the box contents, keep the equipment boxed prior to installation.

table 4.1: Voice alarm controller, box contents

Description	Quantity
Voice alarm controller	1 x
Safety Instructions	1 x
Basic System Manual	1 x
Power cord	1 x
Emergency microphone	1 x
19” rack mounting brackets	2 x
USB cable	1 x

table 4.2: Call station, box contents

Description	Quantity
Call station	1 x
Cat-5 cable	1 x

table 4.3: Router, box contents

Description	Quantity
Router	1 x
Safety Instructions	1 x
Basic System Manual	1 x
Power cord	1 x
19” rack mounting brackets	2 x
USB cable	1 x

4.4 CD-ROM

The CD-ROM in the box of the voice alarm controller contains:

- Configuration Software
- Audio tools (e.g. converters)
- Default messages and chimes
- Plena info
- Basic System Manual

- Installation and User Instructions Manual
- Configuration Software Manual
- Bosch data book

4.5 Mounting the Plena units

The Plena units (controller, router, BGM source and external boosters) are suitable for table-top and 19-inch rack mounting. For each unit, four feet (for table-top use) and two mounting brackets (for 19-inch rack mounting) are supplied. See figure 4.1 for installation details.

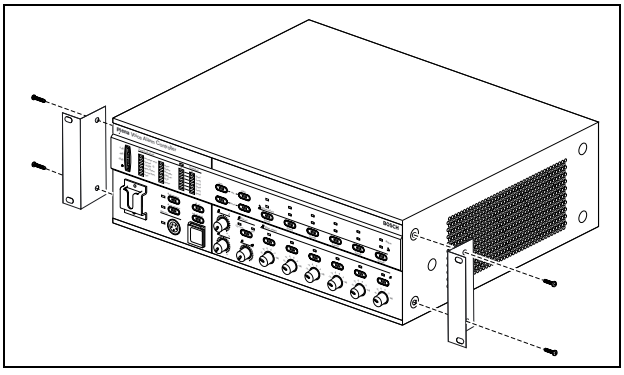

figure 4.1: 19-inch rack mounting

4.6 Connecting routers

To extend the total number of zones, extra routers (LBB1992/00) can be connected to a voice alarm system. Each router adds 6 extra speaker zones to be served in the system. In total 6 extra routers can be connected, allowing for 60 zones in total.

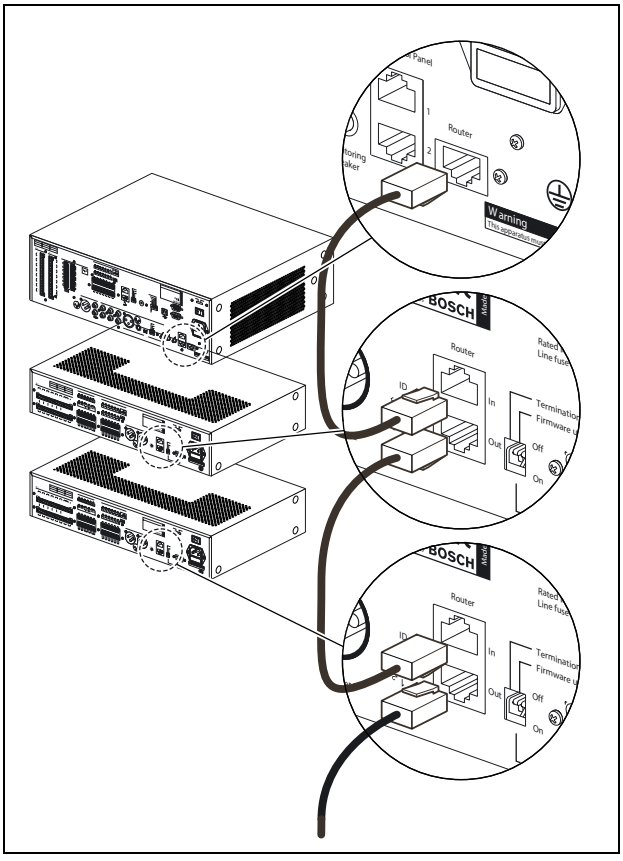

figure 4.2: Connecting routers

4.6.1 Connecting a router to the controller

Plug the RJ45 connector on the one end of the router cable into the *Router* output of the controller. Plug the RJ45 connector on the other end of the cable in the *Router In* input of the router.

4.6.2 Connecting a router to a router

Plug the RJ45 connector on the one end of the router cable into the *Router Out* output of the router. Plug the RJ45 connector on the other end of the cable in the *Router In* input of the router.

4.6.3 Assigning a router ID

Each router must be assigned a unique ID. Use a small screwdriver and turn the arrow, on the ID rotary switch, towards the desired router ID (0 - 9).

4.6.4 Connecting trigger inputs

The rear of the router (and of the controller) provides one terminal block for connecting trigger inputs. As for

the controller, two types of trigger inputs can be connected:

- 6 emergency trigger inputs (see section 4.7.1).
- 6 business trigger inputs (see section 4.7.2).

4.6.5 Connecting trigger outputs

Just like the controller, the router has 3 trigger output contacts. The trigger output contacts (see figure 4.15) can be used to indicate particular states of the system to third-party equipment to trigger certain actions.

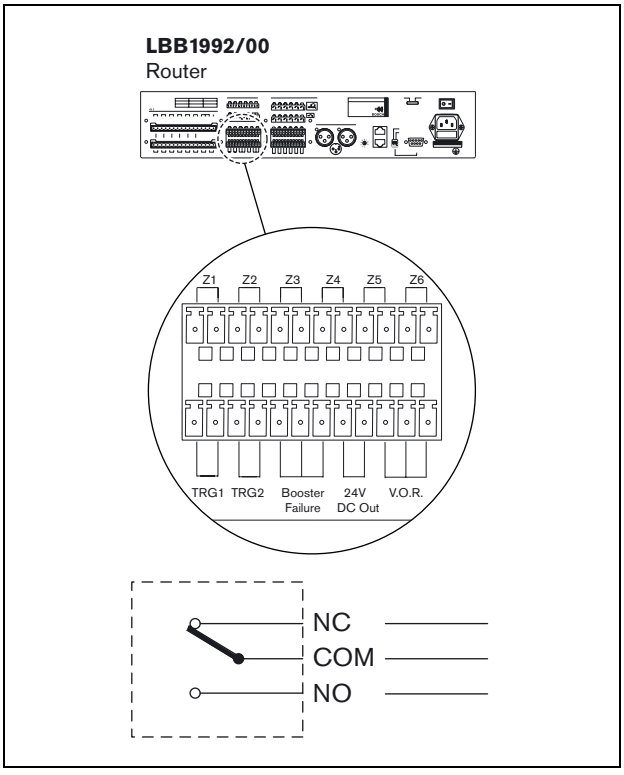

figure 4.3: Connecting trigger outputs

table 4.4: Trigger outputs

Contact	Description
TRG1	Trigger output 1
TRG2	Trigger output 2
Booster Failure	Failure in one of the external boosters

The trigger output contacts are implemented as internal relays offering a normally closed (NC) and a normally open (NO) contact. By default, all contacts are de-energized (NC is connected to COM). On entering one of the states, as mentioned in table 4.4, the corresponding output contact is energized (NO is connected to COM).

4.7 Connecting trigger inputs

The rear of the controller (and of a router) provides one terminal block for connecting trigger inputs. Two types of trigger inputs can be connected:

- 6 emergency inputs (see section 4.7.1).
- 6 business inputs (see section 4.7.2).

4.7.1 Connecting EMG trigger inputs

The upper part of the terminal block (terminals 1 - 6) can be used to connect a maximum of 6 *EMG triggers*. These triggers have a higher priority, in being served, than business triggers and will overrule them.

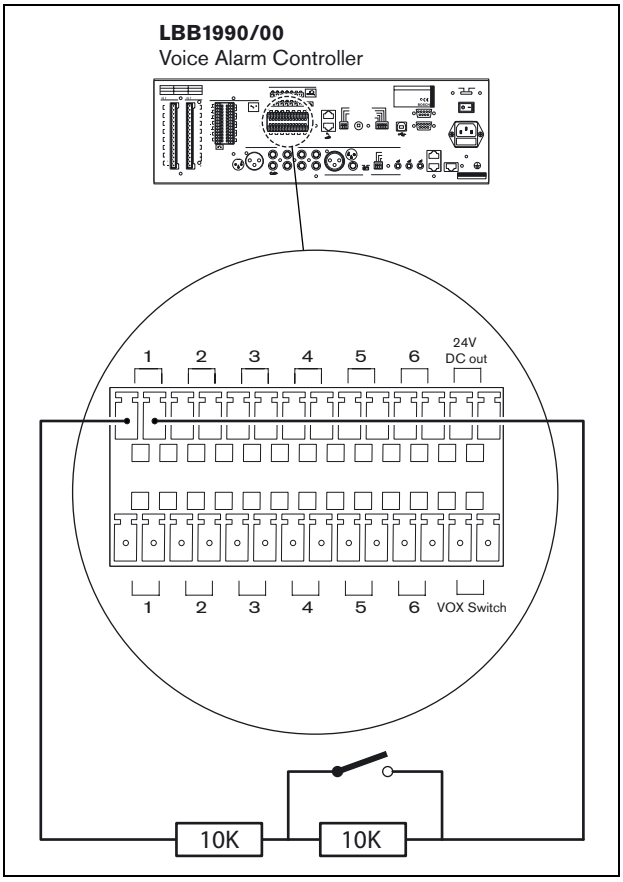

figure 4.4: Connecting EMG triggers

Using the Configuration Software, for each EMG trigger input the following items can be configured:

table 4.5: Configuring an EMG trigger input

Item	Description
Message	Assigns a message(group) as a *.wav* file.
Zone	Assigns a zone(group).
Priority	Assigns a priority (9 - 16).

table 4.5: Configuring an EMG trigger input

Item	Description
Action	Defines the action (open/close).
Type	Defines the type of action (momentary/latching).

Note
Refer to the Configuration Software Manual (9922 141 10381) for information about configuring the EMG trigger inputs.

4.7.2 Connecting business trigger inputs

The lower part of the terminal block (terminals 1 - 6) can be used to connect a maximum of 6 *business triggers*. These triggers have a lower priority, in being served, than EMG triggers and will be overruled by them.

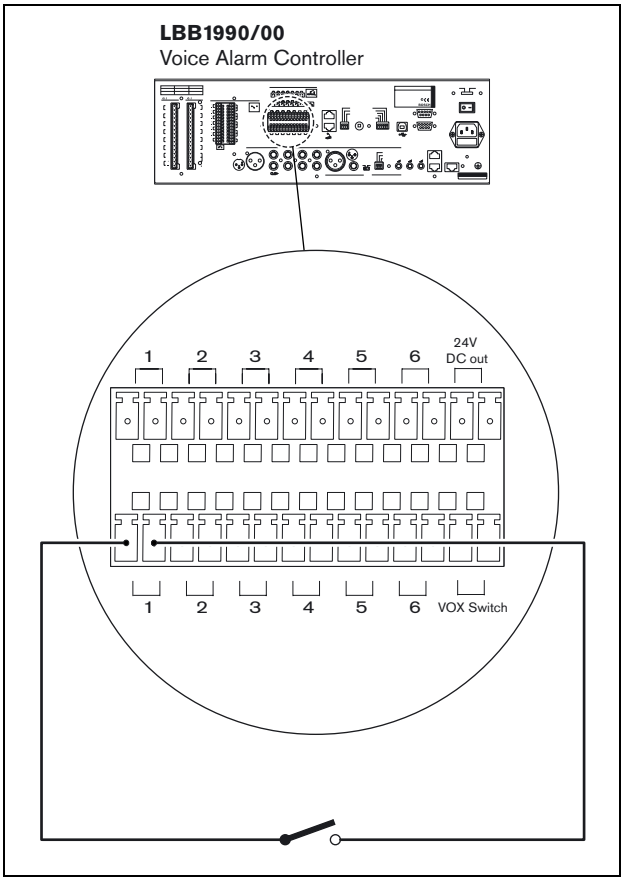

figure 4.5: Connecting business triggers

Using the Configuration Software, for each business trigger input the following items can be configured:

table 4.6: Configuring an business trigger input

Item	Description
Message	Assigns a message(group) as a *.wav* file.
Zone	Assigns a zone(group).
Priority	Assigns a priority (1 - 6).
Action	Defines the action (open/close).
Type	Defines the type of action (momentary/latching).

Note
Refer to the Configuration Software Manual (9922 141 10381) for information about configuring the business trigger inputs.

4.8 Connecting loudspeakers

The controller has six 100 V loudspeaker connectors to connect and serve maximum six loudspeaker zones (Z1 - Z6). Each loudspeaker connector is designed dual-redundant (A and B). In a fully redundant system, loudspeaker lines should be connected to both the A, as well as the B connector.
Business calls, emergency calls and BGM are simultaneously transmitted to a zone over both loudspeaker lines (A and B). If one of the loudspeaker lines fails, it is still possible to use the remaining loudspeaker line. See figure 4.6 for connection details.

Caution
Do not connect more than 5 loudspeakers to the same loudspeaker connector.

Caution
All loudspeakers in the same loudspeaker line must have the same impedance.

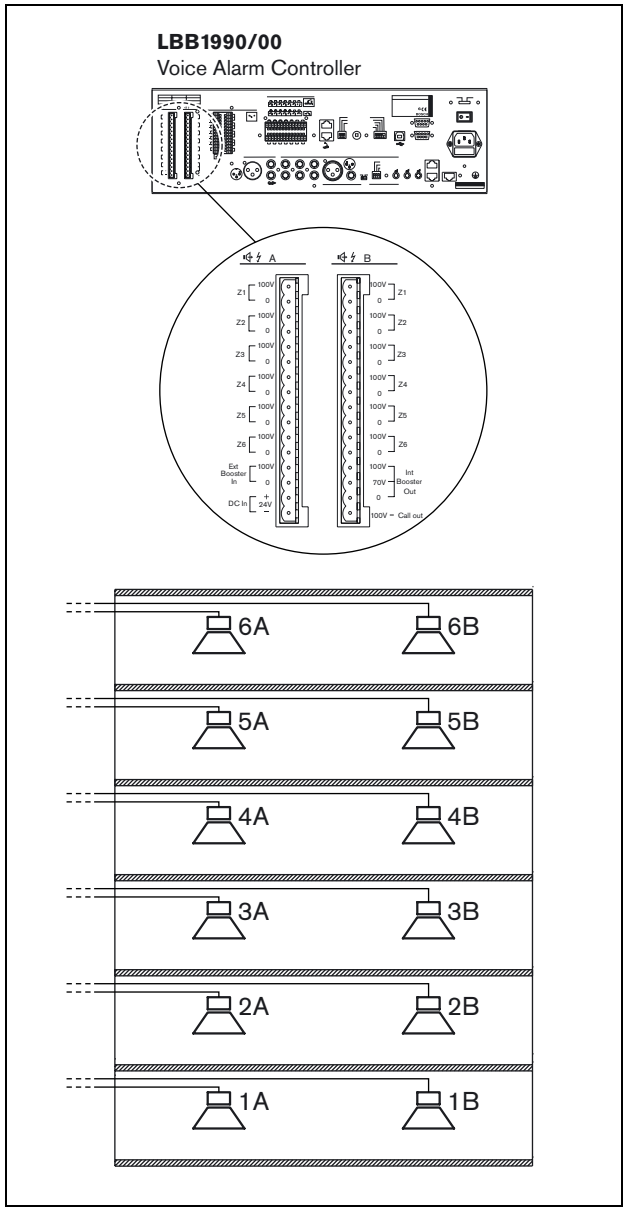

figure 4.6: Connecting loudspeaker zones

4.9 Connecting volume overrides

The controller has six 24V DC volume override connectors, one for each loudspeaker zone (Z1 - Z6, see figure 4.7). Volume override can be used to get a business or emergency call through, regardless of local volume controls. This can be useful in case local zone volumes have been set to a low volume level. Both 4-wire (see section 4.9.1) and 3-wire (see section 4.9.2) override schemes are supported.

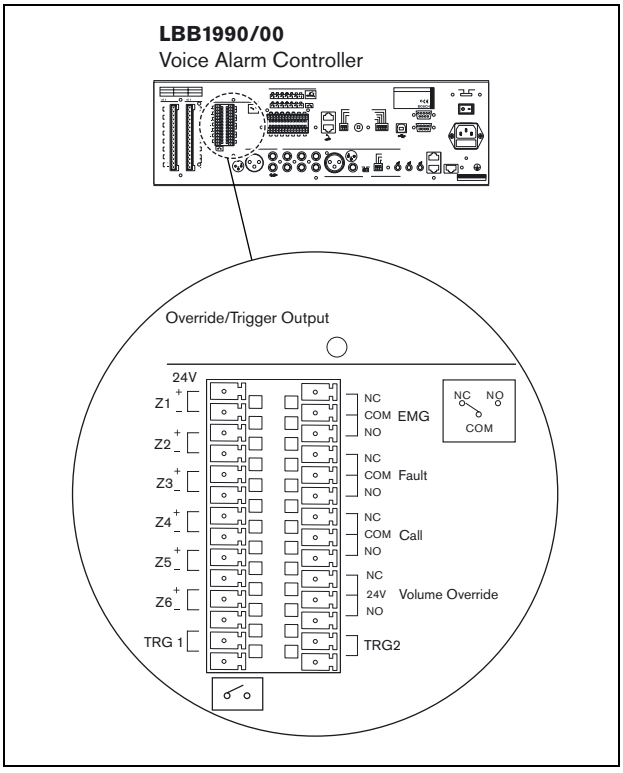

figure 4.7: Volume override outputs

Internally, the positive override pins (*Z+*) are all connected to either the *NC* or the *NO* contact of the *Volume Override* output (see figure 4.8). The negative override pins (*Z-*) are all connected to earth.

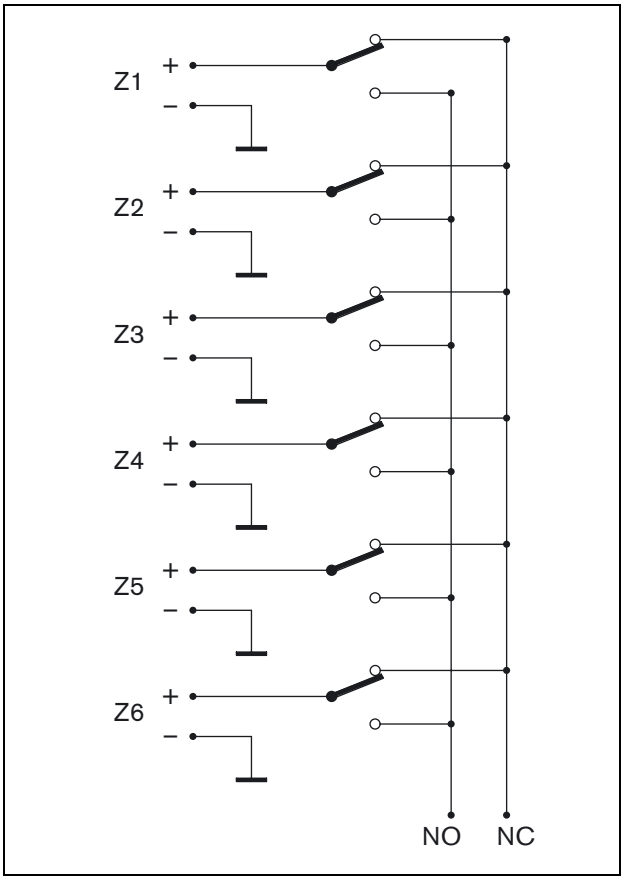

figure 4.8: Volume override contacts

Normally, when there are no active calls, the *Z+* pins are internally connected to the *NC* contact of the *Volume Override*. At the moment a call is started in a zone, the *Z+* pin of the zone is internally connected to the *NO* contact of the *Volume Override*. So, the *NC* and the *NO* contacts determine which voltage is supplied to the positive pins of the override outputs (*Z+*).

4.9.1 4-wire volume override

See figure 4.9, situation I for an example of a fail-safe 4-wire volume override:

- Connect the *NC* contact of the *Volume Override* to the *24V* contact of the *Volume Override*.

See figure 4.9, situation II for an example of a power-saving 4-wire volume override:

- Connect the *NO* contact of the *Volume Override* to the *24V* contact of the *Volume Override*.

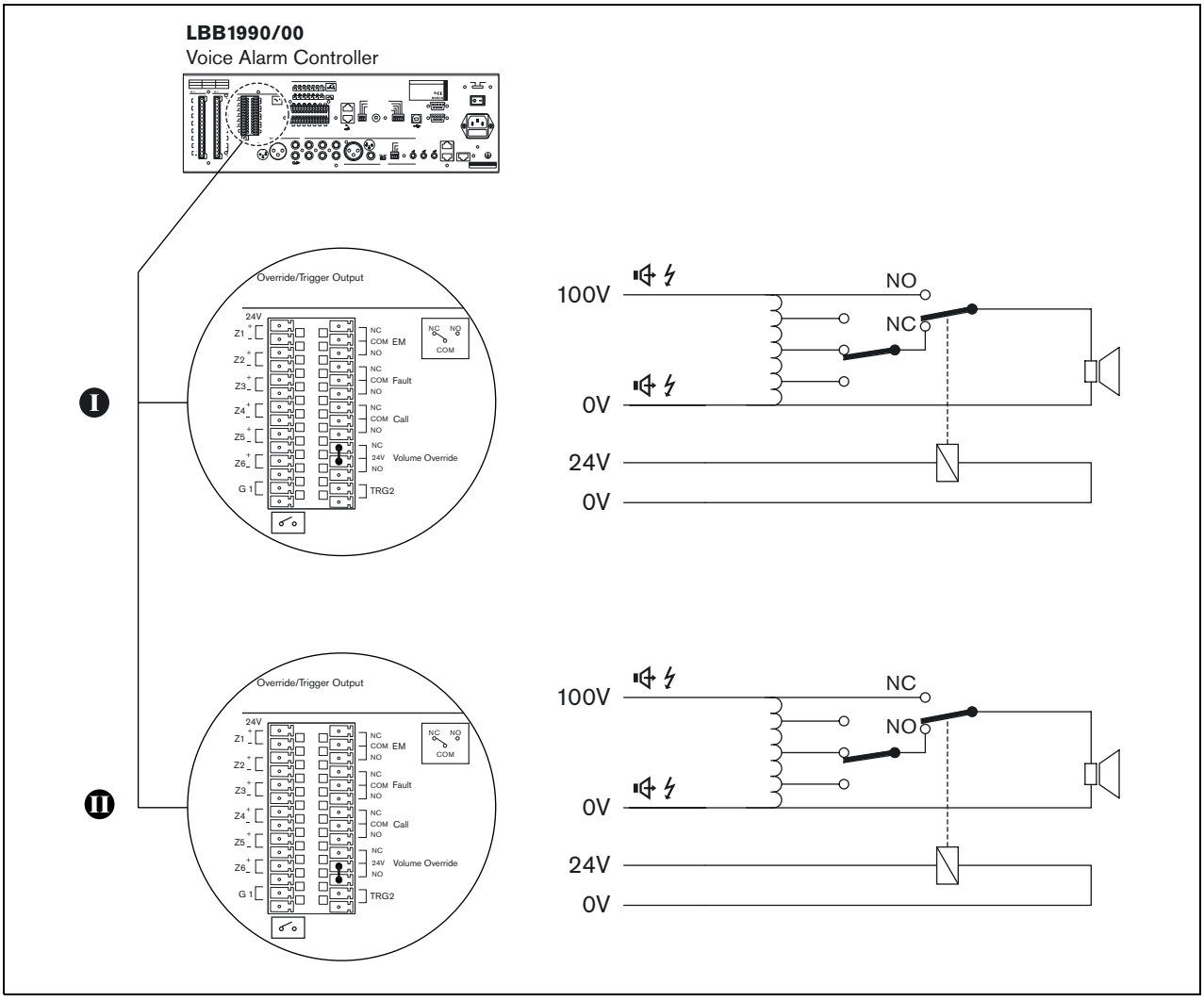

figure 4.9: 4-wire volume override

4.9.2 3-wire volume override

To create a 3-wire volume override, see figure 4.10:

- Connect the *NC* contact of the *Volume Override* to the *0* pin of *Ext Booster In.*
- Connect the *NO* contact of the *Volume Override* to the *100V Call out* pin.

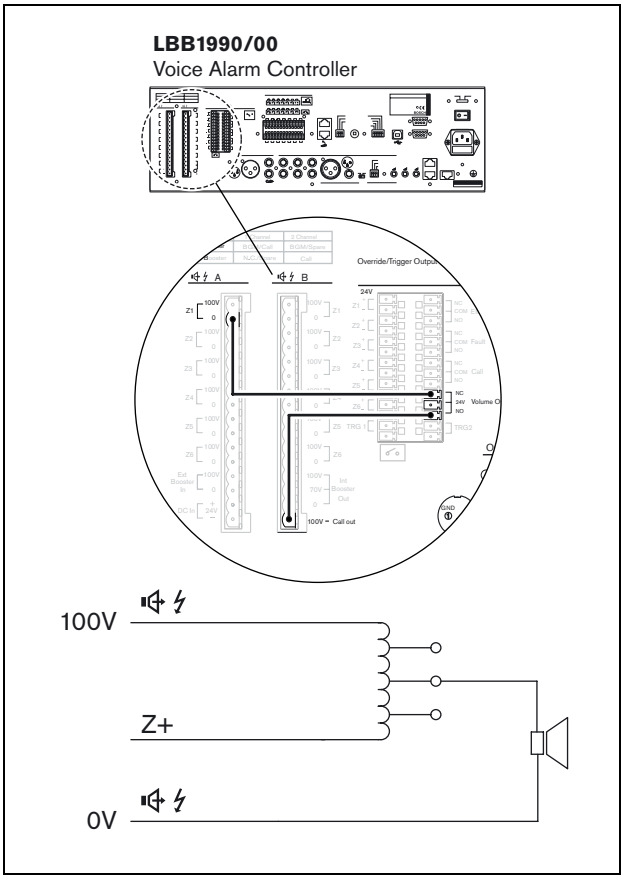

figure 4.10: 3-wire volume override

4.10 Connecting audio inputs

The controller accepts two types of audio sources:

- BGM sources (see section 4.10.1).
- Mic/line input with VOX functionality (see section 4.10.2).

4.10.1 Connecting BGM sources

The controller provides two sets of double cinch sockets for the connection of background music. The following inputs can serve as audio sources:

table 4.7: Audio sources

Audio source	Description
CD/Tuner	A CD or a tuner.
AUX	Auxiliary sound equipment.

Use a double cinch hifi-cable to connect an audio source. For each set of double cinch sockets, the signals, connected to the *L* (left) and *R* (right) sockets, are mixed to form a single input signal.

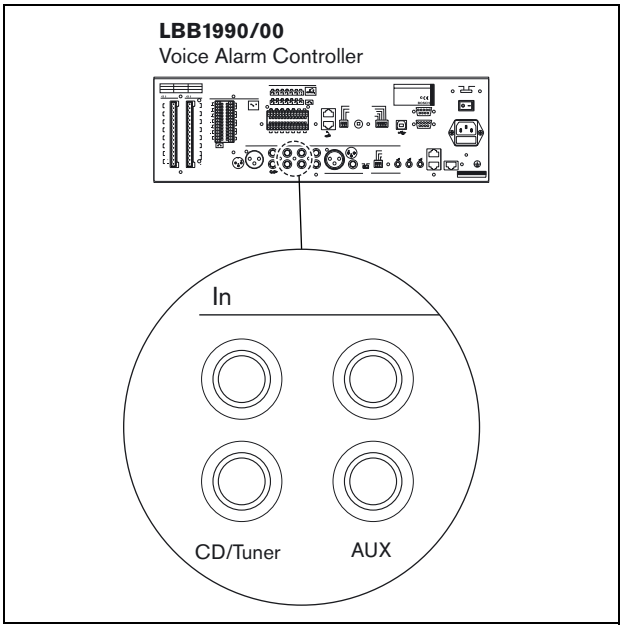

figure 4.11: BGM inputs

4.10.2 Connecting the mic/line input with VOX functionality

The voice alarm controller has 1 mic/line input with voice-activated (VOX) functionality (see figure 4.12). This input has two sockets; one balanced XLR socket and a balanced 6.3 mm jack socket. The signals from both sockets are mixed to form a single input signal.

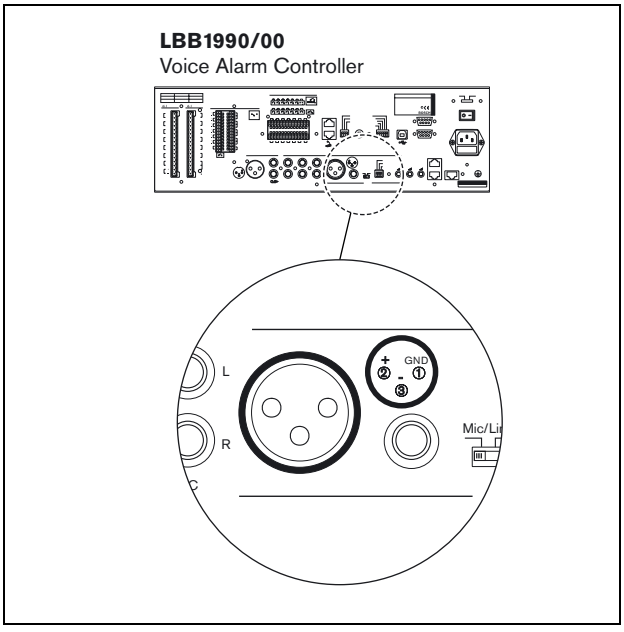

figure 4.12: Mic/line input with VOX functionality

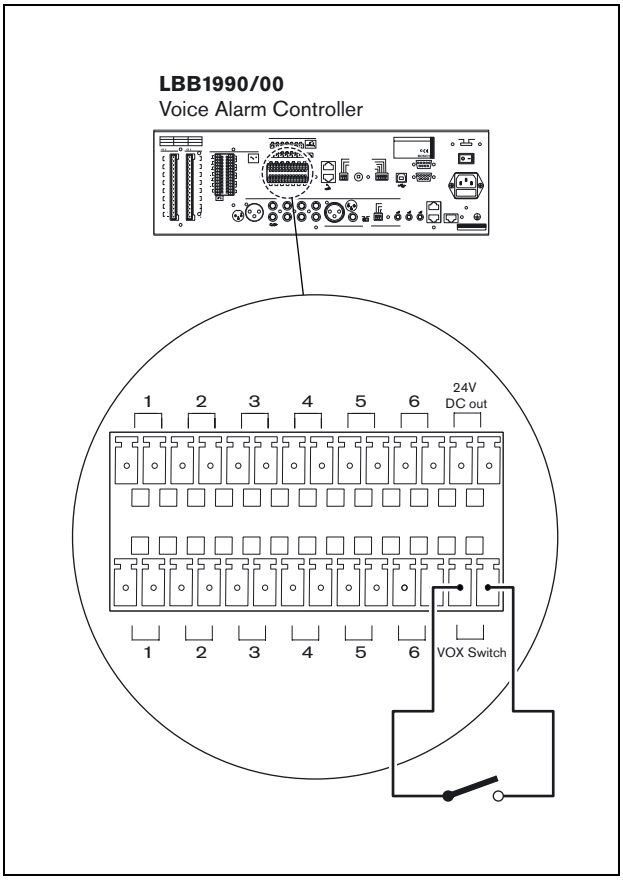

figure 4.13: Connecting a VOX switch

Typically, the mic/line input with VOX functionality is used to connect an additional emergency microphone or to interface with another emergency sound system (e.g. a Praesideo system). Depending on the configuration (see section 4.6), the mic/line input automatically starts an emergency call if the input level > -20 dBr
(100 mV for line and 100 µV for microphone) or if the VOX switch is closed (see figure 4.13 for connection details).

4.11 Connecting line output

The voice alarm controller has one line output (see figure 4.14). This output has a double cinch socket. Both cinch sockets contain the same, mono signal, which consists of the current BGM and calls. The line output can be used to connect the controller to a recording device (e.g. a tape-deck).

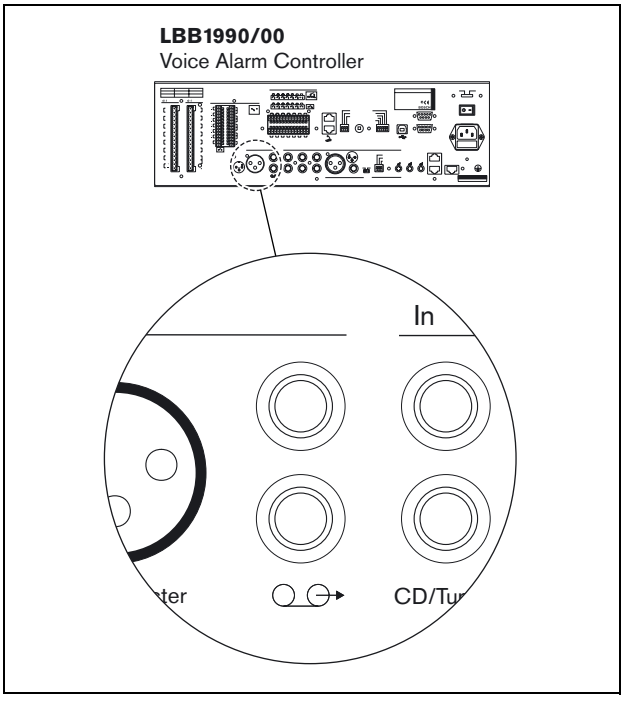

figure 4.14: Connecting line output

4.12 Connecting trigger outputs

The controller has 3 trigger output contacts. The trigger output contacts (see figure 4.15) can be used to indicate the current state of the system to third-party equipment, to trigger particular actions, e.g. activating a signalling light or a beeper if the system has entered the emergency state (see section 6.6).

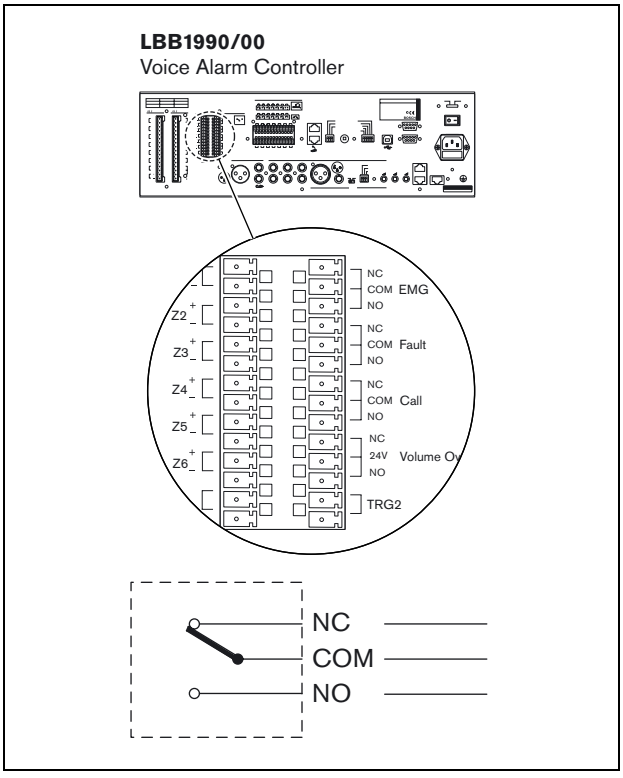

figure 4.15: Connecting trigger outputs

table 4.8: Trigger outputs

Contact	Description
EMG	Emergency state (see also section 4.12.1).
Fault	Fault state (see also section 4.12.2).
Call	Call state (see also section 4.12.3).

The trigger output contacts are implemented as internal relays offering a normally closed (*NC*) and a normally open (*NO*) contact. By default, all contacts are de-energized (*NC* is connected to *COM*). On entering one of the states, as mentioned in table 4.8, the corresponding output contact is energized (*NO* is connected to *COM*).

4.12.1 EMG contact

The EMG contact is activated on entering the emergency state. The emergency state is entered when the EMG button is pressed (see section 6.6) or when an EMG trigger input is activated (see section 4.7.1).

4.12.2 Fault contact

The fault contact is activated on entering the fault state (see section 7.1). The fault state is entered when a line fault (see section 7.2.1) or a system fault (see section 7.2.2) occurs.

4.12.3 Call contact

The call contact is activated on entering the call state. The call state is entered when:

- On one of the call stations the PTT button has been pressed for making a business call (see section 6.5.2).
- An emergency (see section 4.7.1) or business trigger (see section 4.7.2) input is activated.
- The EMG button on the controller has been pressed for making an emergency or alert message (see section 6.6.1).

4.13 Connecting EMG microphone

On the front of the controller there is one connector for an emergency (EMG) microphone.

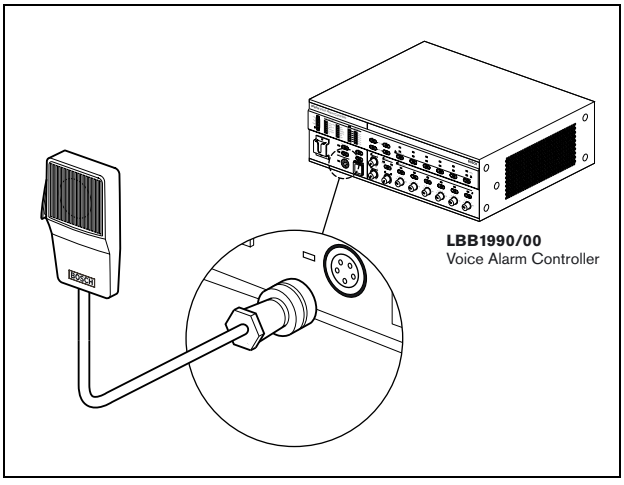

figure 4.16: Connecting the EMG microphone

4.14 Connecting call stations

A call station (LBB1956/00) is connected to the controller using a CAT-5 twisted pair RS-485 cable with RJ45 connectors on each cable end. The controller has two shielded RJ45 sockets allowing 2 call stations to be directly connected to the controller. To connect more call stations, use the two looped-through RJ45 connectors on a call station. Like this, in total, 8 call stations can be part of a system. See figure 4.17 for connection details.

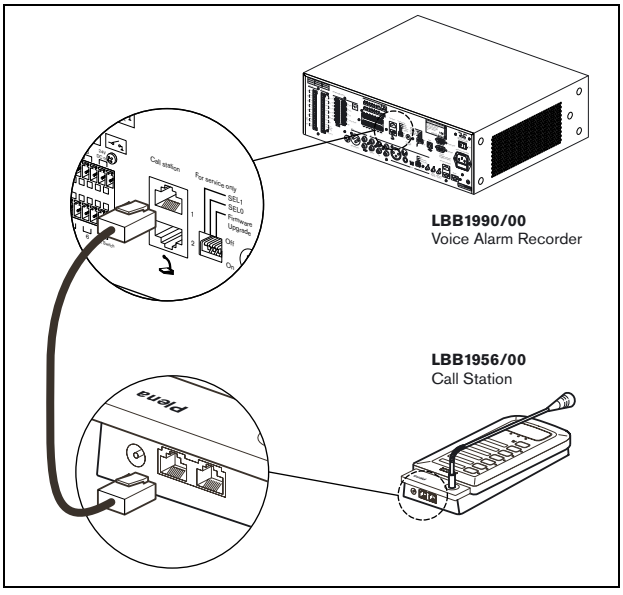

figure 4.17: Connecting call stations

If the cable between the call station and the voice alarm controller is longer than 100 m, the call station must be connected to a 24V(DC) power source. See figure 4.18 for connection details.

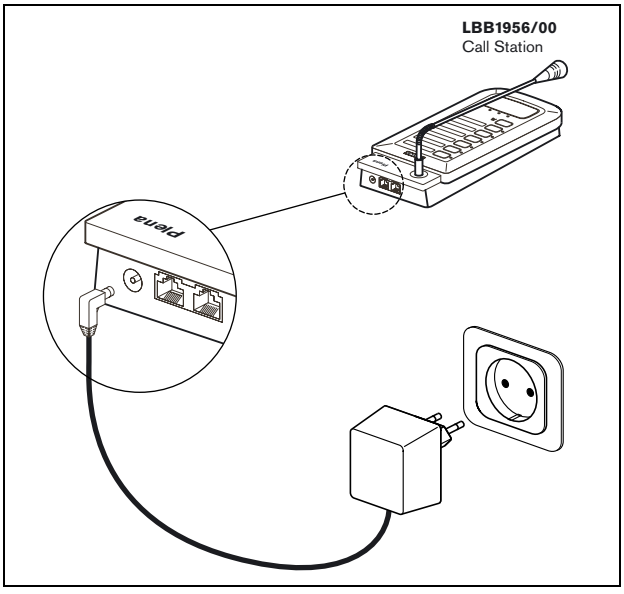

figure 4.18: Call station: connecting a power supply

4.14.1 Connecting call station extension keypads

To be able to select more than 6 zones from a call station, extension keypads (LBB1957/00, maximum 8) can be attached to a call station. Each keypad offers 7 extra zone select buttons. See figure 4.17 for connection details.

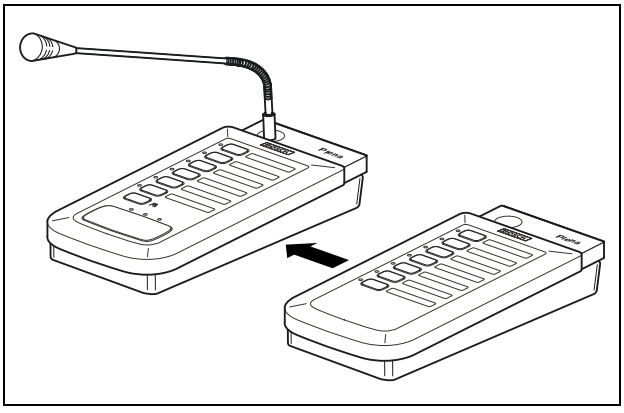

figure 4.19: Call station: connecting keypads

4.15 Connecting the power supply

After all required connections to the controller have been made, the power can be connected. The controller has the following power connections:

- Mains power connection (see section 4.15.1).
- Back-up power connection (see section 4.15.2).

4.15.1 Connecting AC mains power

Proceed as follows to connect the controller to the AC mains power:

1 Select the local AC mains voltage, using the voltage selector on the rear of the controller.

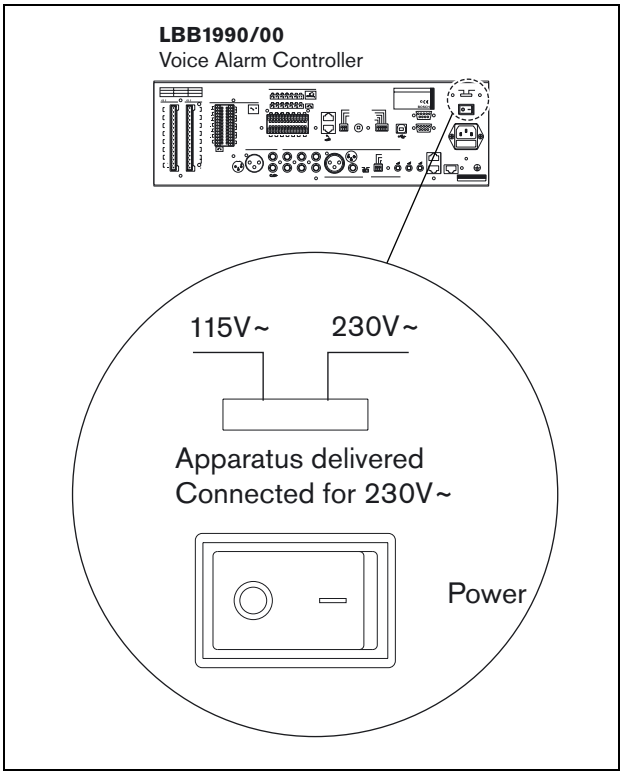

figure 4.20: Voltage selector

table 4.9: Voltage selector

Selector	Mains voltage	Fuse
115	100 - 120 V(AC)	T10L 250V
220	220 - 240 V(AC)	T6.3L 250 V

Note
The LBB1990/00 voice alarm controller is delivered with the voltage selector in the default *220* position.

2 Put the correct fuse in the controller (see table 4.9). Find the fuse holder just below the AC mains power connector.

Note
The LBB1990/00 voice alarm controller is delivered with *??? fuse ???*

3 Connect the one end of a locally approved AC mains cord to the controller (see figure 4.21).
4 Connect the other end of the mains cord to a locally approved mains outlet (see figure 4.21).

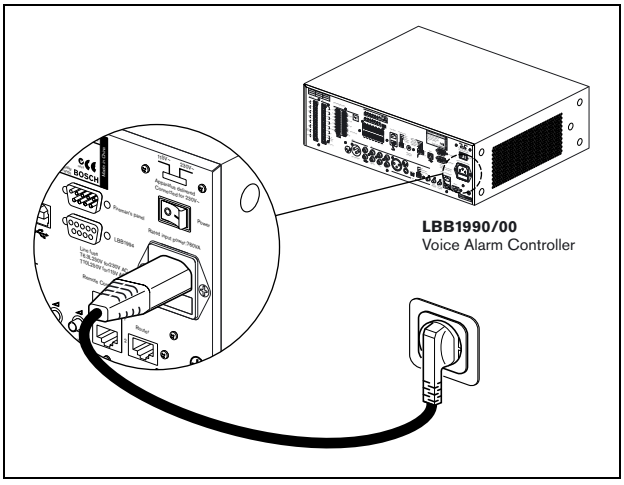

figure 4.21: Connecting the mains cord

4.15.2 Connecting back-up power

The controller has a 24 V DC input to connect a back-up DC power supply (such as a battery) to power the system in case the AC mains power is not available. See figure 4.22 for connection details.

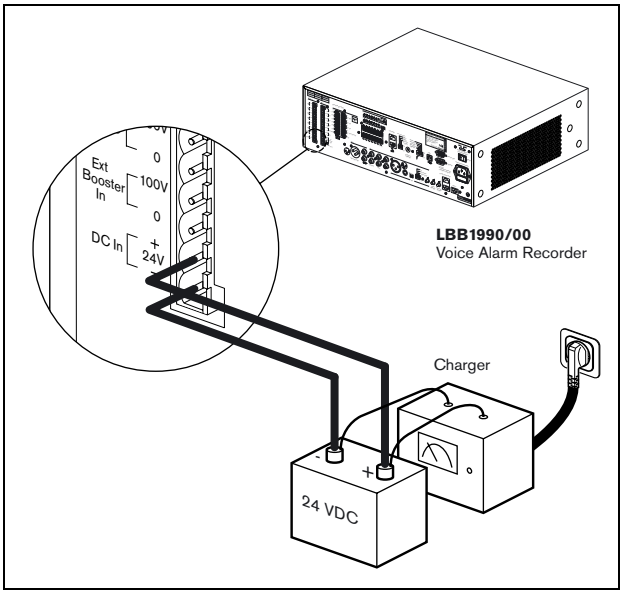

figure 4.22: Connecting a DC back-up power supply

4.15.3 Connecting external boosters

To increase the power that is supplied to the loudspeakers, external boosters can be connected. To the controller, one external booster can be connected (see section 4.15.3.1). To a router, two external boosters can be connected (see section 4.15.3.2).

4.15.3.1 Connecting an external booster to the controller

To connect an external booster to the controller, see figure 4.23.

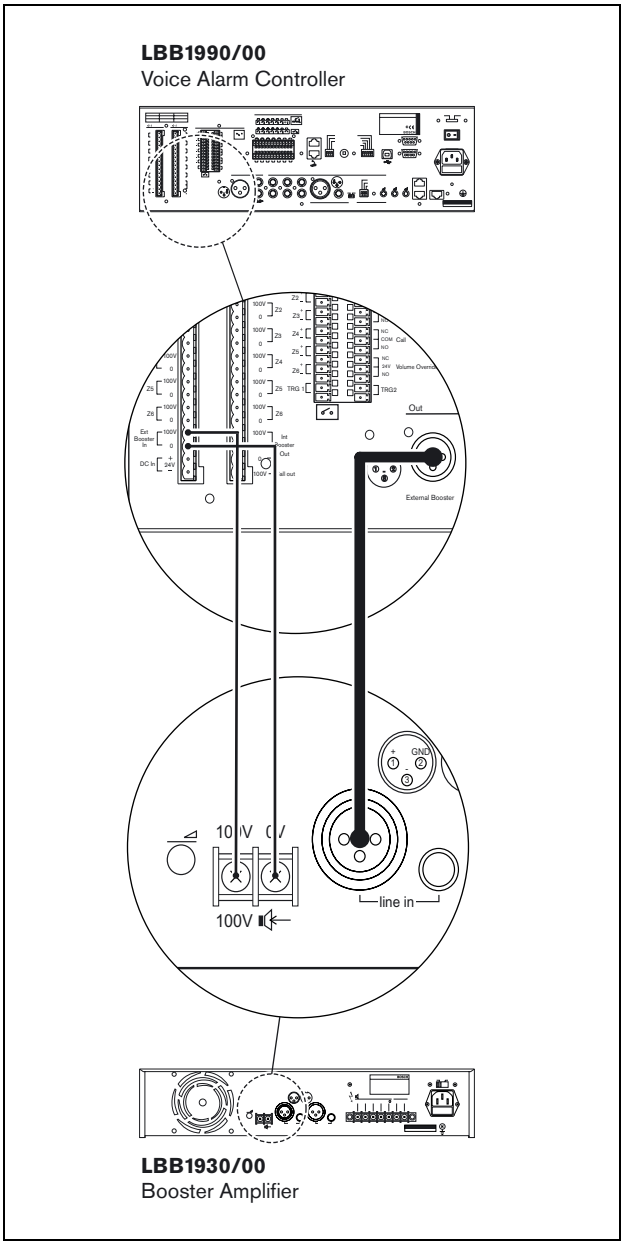

figure 4.23: Connecting an external booster

4.15.3.2 Connecting external boosters to the router

To increase the power in the system, optionally, to each router one or two external boosters can be connected (see figure 4.24). The function of an external booster, depends on the mode for which the controller is configured:

- In 1-channel mode, *external booster 1* is used to amplify calls and BGM, in addition to the controller's internal booster. In 1-channel mode, *external booster 2* has no function.
- In 2-channel mode, *external booster 1* is used to amplify BGM, in addition to the controller's internal booster. *External booster 2* can be connected to amplify calls, in addition to the controller's (mandatory) external booster.

To connect external booster 1 to a router, see figure 4.24.

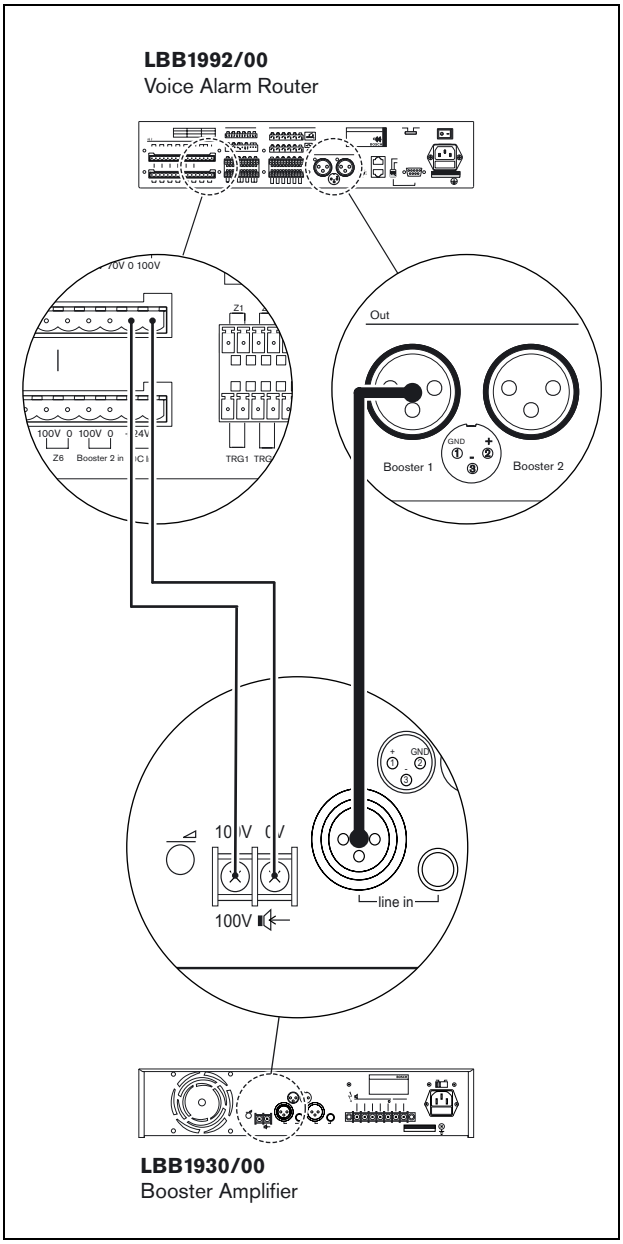

figure 4.24: Connecting external booster 1

To connect external booster 2 to a router, see figure 4.25.

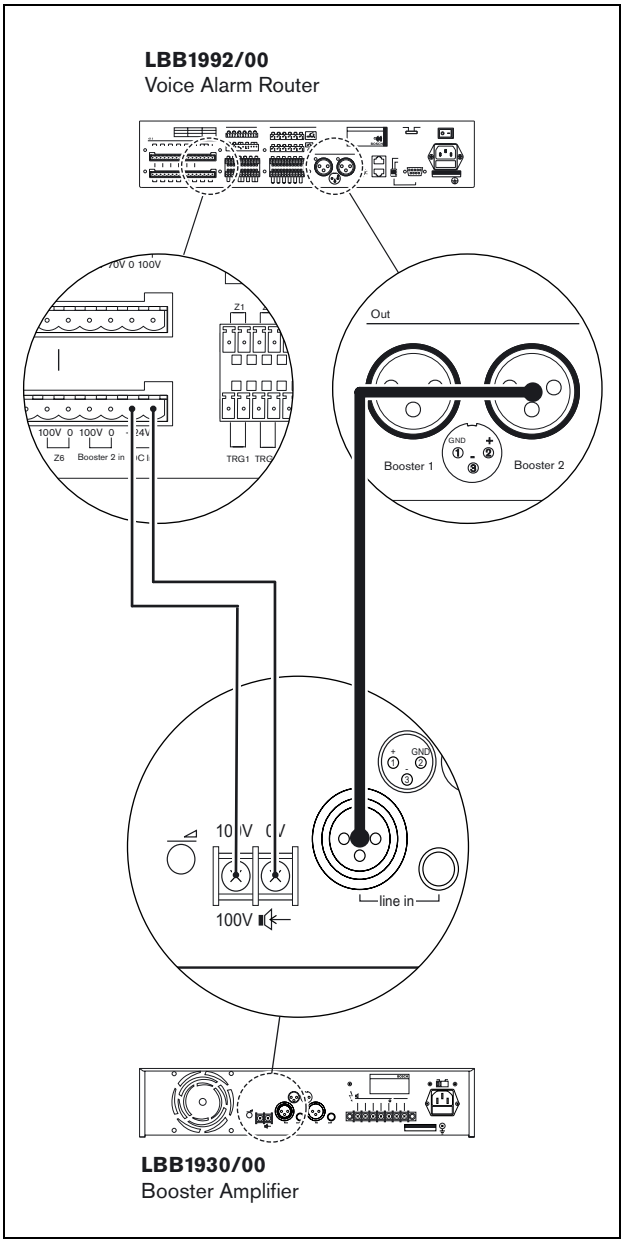

figure 4.25: Connecting external booster 2

Note
In the illustrations above, a booster of type LBB1930/00 is used. However, it is possible to connect any external booster, of the Plena product range, to the router.

5 Configuration

5.1 Introduction

A number of functions within the system are hardware configurable by DIP switches. However, most functions are software configurable, using the Configuration Software.

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about using the software.

5.2 Hardware configuration

A complete Plena Voice Alarm System can be hardware configured using:

- The system settings DIP switch (see section 5.3), the VOX configuration (DIP) switches (see section 5.4.2) and the master volume control knobs on the rear of the controller.
- The CS configuration DIP switch (see section 5.5) on the bottom of each call station.
- The ID rotary switch and the termination switch on the rear of each router (see section 5.6).

5.3 System settings DIP switch

The system settings are configured using the system settings DIP switch on the rear of the controller (see figure 5.1). By default, all switches are in the *OFF* position.

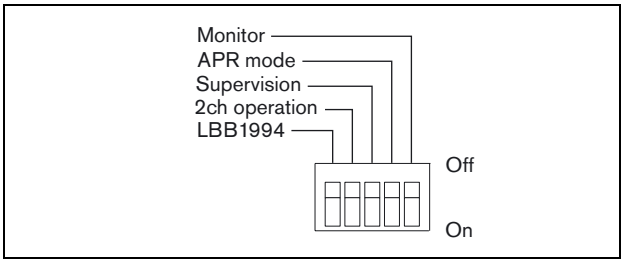

figure 5.1: System settings DIP switch

table 5.1: System settings DIP switch settings

DIP switch	Description
Monitor	Switches the monitoring loudspeaker on (*ON*) or off (*OFF*). See section 5.3.1.
APR mode	Switches the Asian Pacific Region mode on (*ON*) or off (*OFF*). See section 5.3.2.
Supervision	Switches supervision on (*ON*) or off (*OFF*). See section 5.3.3.
2ch operation	Switches 2-channel operation on (*ON*) or off (*OFF*). See section 5.3.4.
LBB1994	For future use. This switch must always be in the *OFF* position.

5.3.1 Monitor

If the *Monitor* switch (see figure 5.1) is in the *ON* position, the internal monitoring loudspeaker of the controller is switched on. The volume of the monitoring loudspeaker is set with the *Monitoring Speaker* master volume control knob (see figure 2.3, no. 35).

5.3.2 APR mode

If the *APR mode* switch (see figure 5.1) is in the *ON* position, the system operates in the Asian-Pacific Region (APR) mode. In APR mode, the system operates according to the emergency standards of the Asian-Pacific Region.

5.3.3 Supervision

If the *Supervision* switch (see figure 5.1) is in the *ON* position, supervision is enabled. If it is in the *OFF* position, supervision is disabled. To indicate that supervision is disabled, the *Disabled* indicator on the front panel of the controller is turned ON (see figure 5.2). For an overview of all functions that can be supervised, see 5.3.3.1.

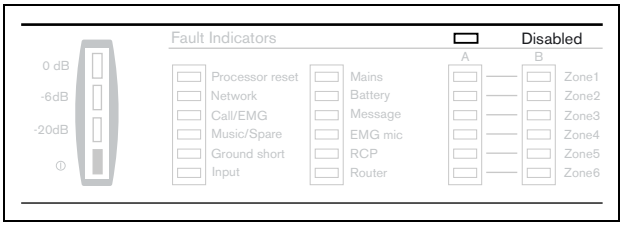

figure 5.2: Supervision: Disabled indicator

Note
Supervision is only necessary for systems that have to comply with the IEC60849 evacuation standard.

5.3.3.1 Overview

The supervised functions can be configured with a PC running the Configuration Software. Using the Configuration Software, supervision for each function can be turned ON or OFF. The default settings are mentioned in table 5.2.

table 5.2: Default supervision settings

Supervised function	Default setting	See
Processor	ON	5.3.3.2.
Network	OFF	5.3.3.3
Messages	ON	5.3.3.4
Line supervision *	ON	5.3.3.5
EMG microphone	ON	5.3.3.6
Trigger inputs *	OFF	5.3.3.7
Mains power	ON	5.3.3.8
Battery power	OFF	5.3.3.9
Internal amplifier	ON	5.3.3.10
VOX 20 kHz input	OFF	5.3.3.11
External amplifier	ON/OFF **	5.3.4

* Can be further configured using the Configuration Software.

** Depends on position of the *2ch operation* switch.

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about adjusting the supervision settings.

5.3.3.2 Processor supervision

If supervision is enabled (see section 5.3.3), the processor of the controller is supervised by a watchdog. If the watchdog receives a reset trigger, the *Processor reset* indicator on the front panel of the controller turns ON, the program memory is checked and the processor resumes operation within 10 seconds. When the fault is acknowledged and reset the indicator turns OFF.

5.3.3.3 Network supervision

If network supervision is enabled (see section 5.3.3), all routers and Remote Control Panels that are connected to the controller are supervised. Routers and RCPs are connected to the controller using an RS-485 CAN interface. If any of the CAN stations fails during the network check, a network error is reported.

5.3.3.4 Message supervision

If supervision is enabled (see section 5.3.3), the internal message manager of the controller is supervised. This message supervision consists of a check-sum mechanism for the wave player and a pilot tone check for the audio path.

5.3.3.5 Line supervision

If supervision is enabled (see section 5.3.3), all loudspeaker lines are supervised, including the loudspeaker lines of any possibly connected routers. Line supervision consists of:

- Short-circuit supervision.
- Impedance supervision.
- Short-to-ground supervision.

Short-circuit supervision

If supervision is enabled (see section 5.3.3), the controller continuously monitors all loudspeaker lines in the system for short-circuits. If a short-circuit with a load impedance of $< 10\ \Omega$ is detected, the line is considered to be short-circuited. In that case, the line output is shut down within 200 ms.

Impedance supervision

If supervision is enabled (see section 5.3.3), the controller measures the impedance of all loudspeaker lines in the system at regular time intervals (by default, once every 100 seconds). The measured values are compared with the reference values (see section 5.3) that are stored in the controller. If the difference is bigger than a preset differential accuracy (by default, 15%), the line is considered faulty.

Note
For a correct impedance supervision:
Do not connect more than 5 loudspeakers to the same loudspeaker line and make sure that all loudspeakers, that are connected to the same loudspeaker line, have the same impedance.

Using the Configuration Software, it is possible to:
- Adjust the measurement interval by choosing one of the predefined values (30 seconds - 24 hours).
- Adjust the preset differential accuracy (5 - 20%).
- Define a preset starting time, to automatically trigger an impedance supervision measurement, once every day.

Note
Refer to the Configuration Software Manual (9922 141 10381) for details about configuring line supervision.

Short-to-ground supervision
If supervision is enabled (see section 5.3.3), the controller continuously monitors all loudspeaker lines in the system for short-to-ground situations. If a leakage current $> 30 \pm 15$ mA is detected in a line, all lines are considered faulty.

5.3.3.6 Emergency microphone supervision
If supervision is enabled (see section 5.3.3), the audio path of the emergency microphone is monitored from the microphone's capsule to the input connector on the controller.

5.3.3.7 Trigger input supervision
If trigger input supervision is enabled, the EMG trigger inputs of the controller and of any connected routers, are supervised. The bussiness trigger inputs are not supervised.

5.3.3.8 Mains power supervision
If supervision is enabled (see section 5.3.3), the availability of the mains power is supervised.

5.3.3.9 Battery power supervision
If battery power supervision is enabled, the availability of the battery power is supervised.

5.3.3.10 Internal booster supervision
If supervision is enabled (see section 5.3.3), the internal booster of the controller is supervised. The function of this booster depends on the position of the *2ch operation* switch (see also section 5.3.4).

table 5.3: Internal booster functions

Operational mode	Function
1-channel	BGM/Call booster
2-channel	BGM/Spare booster

5.3.3.11 20 kHz VOX input supervision
If VOX 20kHz input supervision is enabled, the 20 kHz mic/line input with VOX functionality of the controller is supervised.

5.3.3.12 External booster supervision
If supervision is enabled (see section 5.3.3) and the *2ch operation* switch (see section 5.3.4) is in the *ON* position, the external booster is supervised. In 2-channel mode, the external amplifier is always the call booster.

5.3.4 2-channel operation

If the *2ch operation* switch (see figure 5.1) is in the *ON* position, the controller operates in the 2-channel mode. If the *2ch operation* switch is in the *OFF* position, the controller operates in the 1-channel mode.

5.3.4.1 1-channel mode

In the 1-channel mode, all calls and BGM are amplified by the internal booster of the controller. If desired, an external booster can be connected for spare switching (see section 3.9). In 1-channel mode, all calls will interrupt the BGM. The external booster is not supervised (see section 5.3.3.12).

table 5.4: 1-channel mode

Booster	Function
Internal	BGM/Call booster
External	Not connected/Spare booster

5.3.4.2 2-channel mode

In the 2-channel mode, connecting an external booster to the controller is mandatory (see section 3.9). The external booster amplifies the calls. The internal booster amplifies the BGM. If the external booster fails, the calls are amplified by the internal booster. In 2-channel mode, calls do not interrupt the BGM. The external booster is supervised (see section 5.3.3.12).

table 5.5: 2-channel mode

Booster	Function
Internal	BGM/Spare booster
External	Call booster

5.4 Mic/line input with VOX functionality configuration

If the mic/line input with VOX functionality of the controller is connected, configuration is done using the VOX input source selector and the VOX configuration DIP switch.

The priority (1 - 14) and the zone(s) or zone group(s) to be served by the mic/line input can be configured using the Configuration Software.

Note
Refer to the Configuration Software Manual (9922 141 10381) to configure the mic/line input with VOX functionality.

5.4.1 VOX input source selector

The type of VOX input source is set using the *mic/line* selector on the rear of the controller (see figure 5.3). If the VOX input source is a microphone, put the selector in the *Mic* position. If the VOX input source is a line-level source, put the selector in the *Line* position.

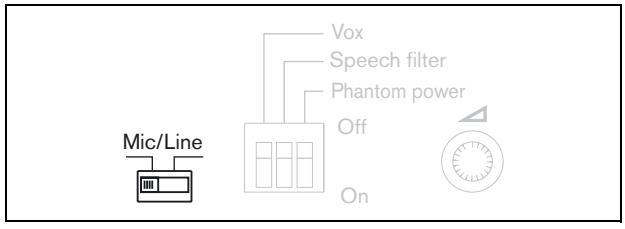

figure 5.3: VOX input source selector

5.4.2 VOX configuration DIP switch

The VOX input is configured using the VOX configuration DIP switch on the rear of the controller (see figure 5.4). By default, all switches are in the *OFF* position.

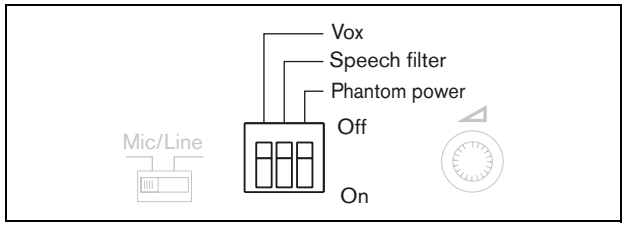

figure 5.4: VOX configuration DIP switch

The settings that can be made using the DIP switches are explained in a table on the rear of the controller (see figure 5.5).

	Off	On
1	VOX activate by mic.	VOX activate by VOX Switch
2	Speech filter	Flat
3	Phantom power Off	Phantom power On

figure 5.5: VOX settings table

5.4.3 VOX volume control

The volume of the VOX input is set with the VOX volume control knob (see figure 5.6).

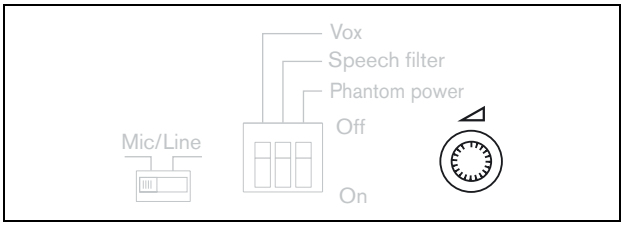

figure 5.6: VOX input volume control knob

5.4.4 Vox

If the *Vox* switch (see figure 5.1) is in the *ON* position, the mic/line input with VOX functionality is activated when the voltage signal level of the input source rises above the threshold level. If the *Vox* switch is in the *OFF* position, the behavior depends on the connection of a VOX switch:

- If a VOX switch is not connected, the mic/line input is disabled.
- If a VOX switch is connected, the mic/line input is activated when the *VOX Switch* trigger input is closed (see also section 3.13).

5.4.5 Speech filter

If the *Speech filter* switch is in the *ON* position, a speech filter is activated for the VOX input. The speech filter improves the intelligibility of speech, by cutting off the lower frequencies. Using the speech filter is only then useful if the input source is a microphone. If the input source is not a microphone, leave the switch in the *OFF* position.

5.4.6 Phantom power

If the *Phantom power* switch is in the *ON* position, a 24 V DC phantom power supply to the VOX microphone is activated. The phantom power only has to be used if the VOX microphone requires a phantom power. If the input source is not a microphone or if the microphone does not accept phantom power, leave the switch in the *OFF* position.

5.5 Call station configuration DIP switch

The call stations are configured using the configuration DIP switch at the bottom of a call station (see figure 5.7).

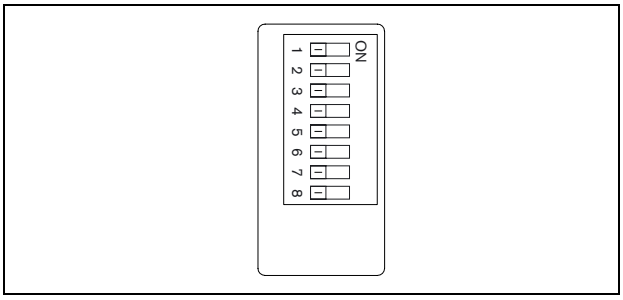

figure 5.7: Call station configuration DIP switch

table 5.6: DIP switch settings

DIP switch	Description
1, *2*, *3*, *4*	The ID of the call station. See section 5.5.1.
5, *6*	The sensitivity of the call station. See section 5.5.2.
7	Switches the speech filter on (*ON*) or off (*OFF*). See section 5.5.3.
8	Switches termination on (*ON*) or off (*OFF*). See section 5.5.4.

5.5.1 Call station ID

The ID of a call station is set using switches 1 to 4. Maximum 8 call stations can be connected to the controller. Each CS should be assigned a unique ID (1 - 8). Set the switches in the correct positions, refer to table 5.7.

table 5.7: Call station ID settings

ID	Switch 1	Switch 2	Switch 3	Switch 4
1	*OFF*	*OFF*	*OFF*	*OFF*
2	*OFF*	*OFF*	*OFF*	*OFF*
3	*OFF*	*OFF*	*OFF*	*OFF*
4	*OFF*	*OFF*	*OFF*	*OFF*
5	*OFF*	*OFF*	*OFF*	*OFF*
6	*OFF*	*OFF*	*OFF*	*OFF*
7	*OFF*	*OFF*	*OFF*	*OFF*
8	*OFF*	*OFF*	*OFF*	*OFF*

5.5.2 Sensitivity

The sensitivity of the call station's microphone is set using switches 5 and 6 (see table 5.8).

table 5.8: Call station sensitivity

Sensitivity	Switch 5	Switch 6
-15 dB	*OFF*	*OFF*
0 dB	*OFF*	*ON*
6 dB	*ON*	*OFF*
Reserved	*ON*	*ON*

5.5.3 Speech filter

If switch *7* is in the *ON* position, a speech filter is activated for the call station. The speech filter improves the intelligibility of speech, by cutting off the lower frequencies.

5.5.4 Termination

The last CS in a sequence of looped-through call stations, must always be terminated. Only for this call station, switch *8* must be in the *ON* position.

5.6 Router

The router is configured using ID rotary switch and the termination switch at the rear of a router (see figure 5.8).

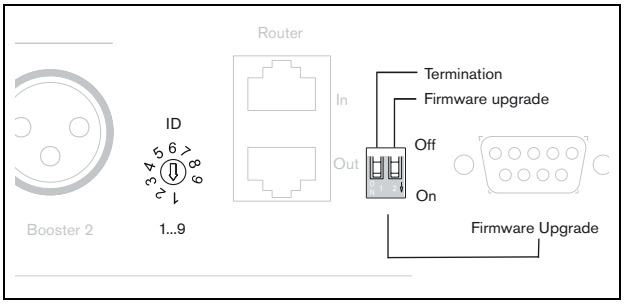

figure 5.8: ID rotary switch and termination switch

5.6.1 ID rotary switch

The ID of a router is set using the ID rotary switch. Each router should be assigned a unique ID (1 - 9). Use a small screwdriver to turn the arrow in the correct position.

5.6.2 Termination switch

The last router in a sequence of looped-through routers, must always be terminated. Only for this router, the termination switch *ON* position.

6 Operation

6.1 Switching ON

To switch on the power, put the *Power* switch on the rear of the voice alarm controller (see figure 6.1) in the *I* position.

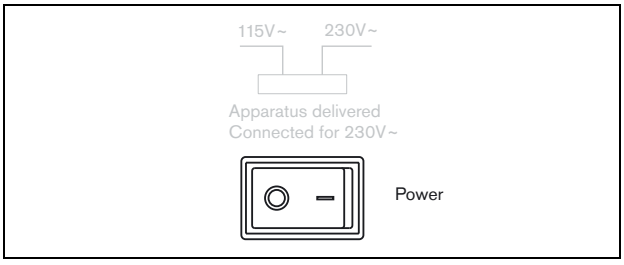

figure 6.1: Power switch

If mains power or back-up power is available, the power indicator on the front of the voice alarm controller is turned ON (see figure 6.2).

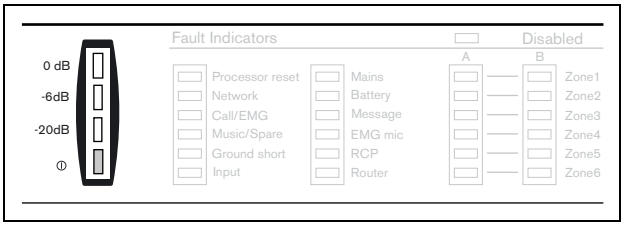

figure 6.2: Power indicator

Note that, on each connected call station, the power indicator is turned ON (see figure 2.4, no. 7).

Note
If the system is switched ON for the first time and supervision is enabled, make sure to first calibrate the system (see section 6.3).

6.2 Switching OFF

To switch the system OFF, put the *Power* switch of the voice alarm controller (see figure 6.1) in the *0* position.

6.3 Calibrating the controller

If the system is switched on for the first time and supervision is enabled, the voice alarm controller must be calibrated. During a calibration, all loudspeaker line impedances are measured and stored as reference values in the controller. These values are used for line supervision calculations (see section 5.3.3.5). To calibrate the controller, push the calibration button, located on the back of the controller (see figure 2.3, no. 24).

Note
During each calibration, the old stored reference values in the controller are overwritten with the new measured values.

6.4 Background music

The background music (BGM) is controlled using the BGM zone controls on the front of the controller (see figure 2.3, no. 6). Follow the next steps to distribute BGM to the zones:

1 Select a BGM source (see section 6.4.1).
2 Select one or more zones (see section 6.4.2).

6.4.1 Selecting a BGM source

Select the BGM source with the *BGM source selector* (toggle) button (see figure 6.3). A green LED indicates which BGM source is selected.

- Select *CD/Tuner* if a CD or tuner is used for the background music (see also section 3.7).
- Select *AUX* if an auxiliary audio source is used for the background music (see also section 3.7).

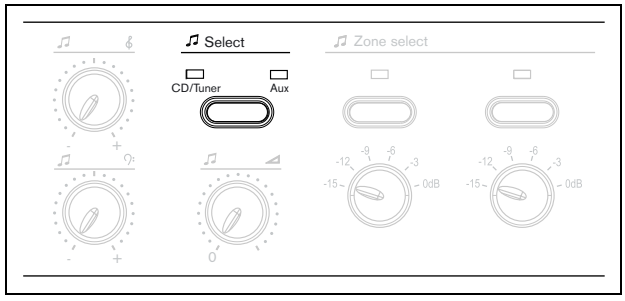

figure 6.3: BGM source selector

Note
The default BGM source is *CD/Tuner*.

6.4.2 Selecting BGM zones

The BGM can be distributed to one or more zones. Use the *Zone select* (toggle) buttons (see figure 6.4) to select the zones. A green *Zone select* LED indicates if the corresponding zone is selected.

- If a *Zone select* indicator is turned OFF, no BGM is distributed to that zone. Press the *Zone select* button to start distributing BGM to that zone.
- If a *Zone select* indicator is turned ON, BGM is distributed to that zone. Press the *Zone select* button to stop distributing BGM to that zone.

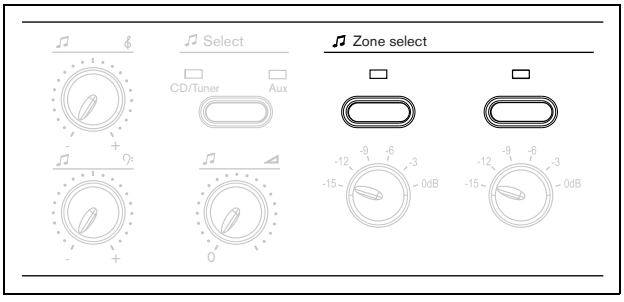

figure 6.4: BGM: Zone select buttons

6.4.3 Adjusting BGM volume

The voice alarm controller has two types of controls to adjust the BGM volume (see figure 6.5). The overall (maximum) volume of the BGM source is set with the master volume control, which is located below the BGM source selector (*Select* button, see figure 6.3). Per zone, the local volume can be adjusted with the zone volume switches, which are located below the zone selection keys (*Zone select*, see figure 6.4).

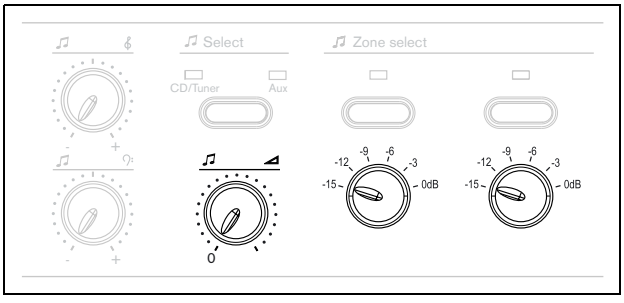

figure 6.5: BGM volume controls

6.4.4 Adjusting BGM tone

The voice alarm controller has two rotary knobs to adjust the sound of the BGM (see figure 6.6).

- Use the upper rotary knob to adjust the treble or high frequency content of the BGM.
- Use the lower rotary knob to adjust the bass or low frequency content of the BGM.

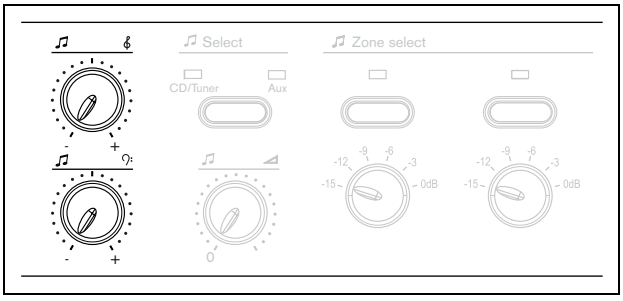

figure 6.6: BGM tone keys

6.5 Business calls

Business calls can only be made from a call station. It is not possible to use the hand-held emergency microphone for making business calls. Proceed as follows to make a business call from a CS:

1 Select one or more zones (see section 6.5.1).
2 Make the announcement (see section 6.5.2).

6.5.1 Selecting zones

Select the zones to which the business call must be distributed by pressing the corresponding *Zone select* buttons (see figure 6.7). A green *Zone select* LED next to a button, indicates that the zone is selected.

- If a *Zone select* indicator is turned OFF, the zone is not selected. Press the *Zone select* button to select the zone.
- If a *Zone select* indicator is turned ON, the zone is selected. Press the *Zone select* button to deselect the zone.

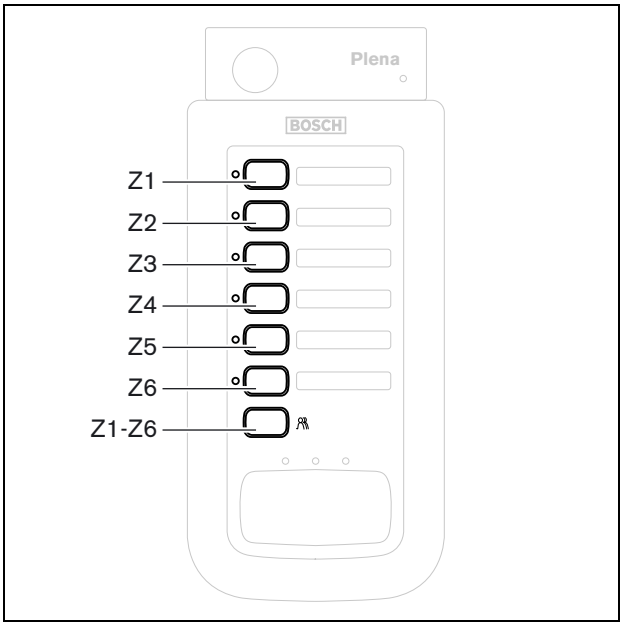

figure 6.7: CS: Zone select buttons

To simultaneously select all zones, press the *All call* button (the bottommost *Zone select* button).

6.5.2 Making a business announcement

Press the PTT button (Push To Talk) button (the big bottommost button on top of the call station) and speak into the microphone (see figure 6.8). The call is only distributed to the selected zones (see section 6.5.1).

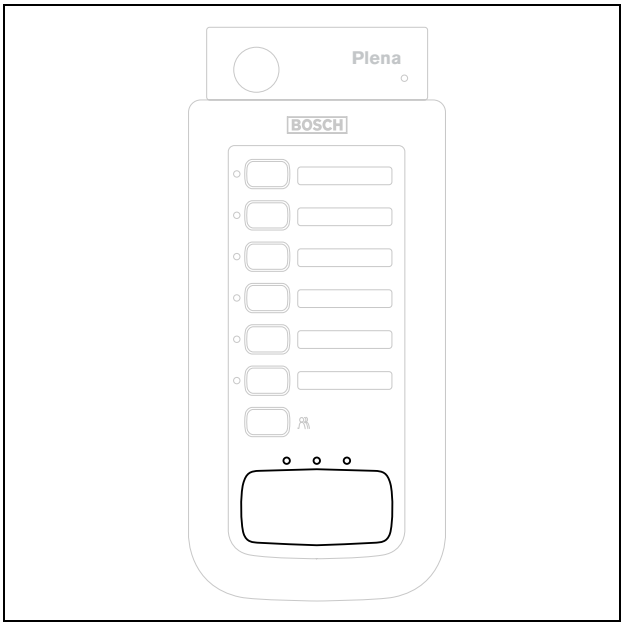

figure 6.8: CS: PTT button and indicators

The LEDs above the PTT button provide information about the status of the call station (see table 6.1).

table 6.1: CS: Status indicators

Indicator	Description
Green	PTT button is pressed.
Yellow	Fault.
Red	System is in emergency state. The call station is disabled.

6.6 Emergency state

Emergency calls/messages can only be distributed when the system is in the emergency state (to enter the EMG state, see section 6.6.1). In the emergency state, it is possible to distribute the following emergency calls/messages:

- Emergency calls (live speech) with the hand-held emergency microphone (see section 6.7).
- The prerecorded alert message (see section 6.8).
- The prerecorded alarm messages (see section 6.9).

Note
Prerecorded EMG, alarm and alert messages can be stored in the controller and assigned to the respective buttons. Refer to the Configuration Software Manual (9922 141 10381) for details.

Note
In the emergency state, it is not possible to distribute live speech from a call station. When the system enters the emergency state, all call stations are automatically disabled.

6.6.1 Entering the emergency state

To enter the emergency state, press the EMG button on the front of the controller (see figure 6.9). The integrated red LED turns ON.

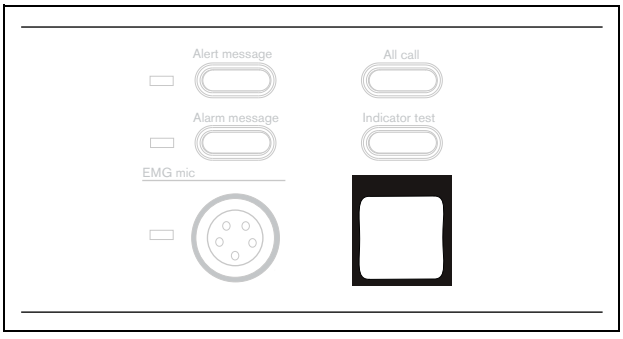

figure 6.9: EMG button

At the moment the emergency state is entered, simultaneously, the prerecorded EMG message is broadcast to all zones and the controller's integrated beeper starts. To exit the emergency state, see section 6.6.3.

6.6.2 Stopping the beeper

Press the *EMG Acknowledge* button to stop the beeper. By pressing the *EMG Acknowledge* button, the emergency state is acknowledged (see figure 6.10).

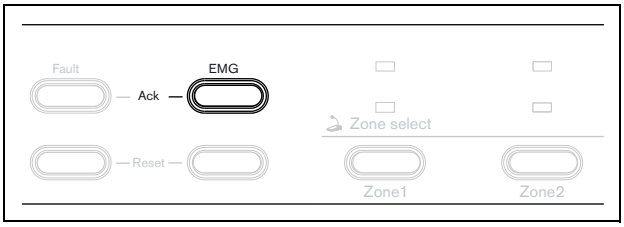

figure 6.10: EMG Acknowledge button

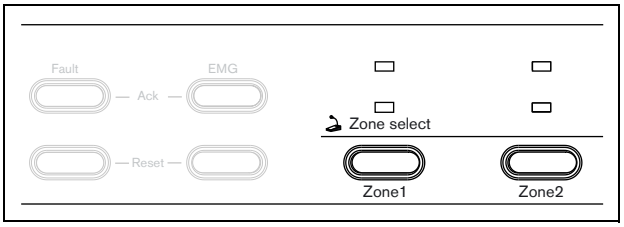

figure 6.12: Zone select buttons

6.6.3 Exiting the emergency state

Exit the emergency state by pressing the *EMG Reset* button (see figure 6.11).

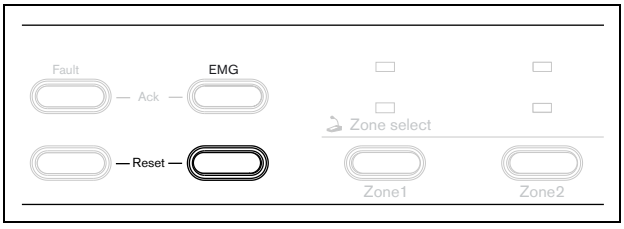

figure 6.11: EMG reset button

6.7 Emergency calls

Proceed as follows to distribute a live spoken emergency call:

1 Enter the emergency state (see section 6.6.1).
2 Select one or more zones (see section 6.7.1).
3 Make the emergency call by using the EMG microphone (see section 6.7.2).
4 Exit the emergency state (see section 6.6.3).

6.7.1 Selecting zones

Select the zones to which the call/message must be distributed by pressing the corresponding *Zone select* buttons (see figure 6.12). A red *Zone select* LED above a button, indicates that the zone is selected.

- If a *Zone select* indicator is turned OFF, the zone is not selected. Press the *Zone select* button to select the zone.
- If a *Zone select* indicator is turned ON, the zone is selected. Press the *Zone select* button to deselect the zone.

To simultaneously select all zones, press the *All call* button (see figure 6.13).

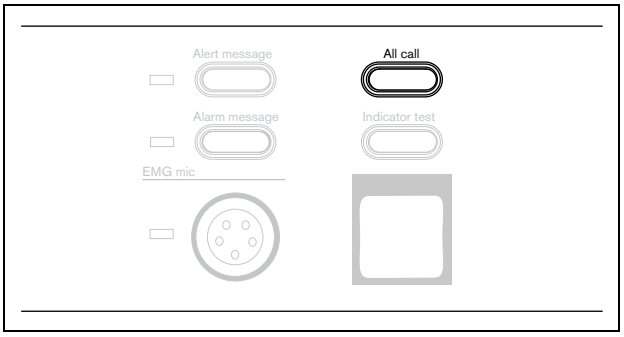

figure 6.13: All call button

Note
If no zones are selected, the call/message is automatically distributed to all zones in the system.

6.7.2 Making an emergency call

Press the PTT (Push To Talk) button (on the left side of the EMG microphone) and speak into the microphone (see figure 6.14). The call is only distributed to the selected zones (see section 6.7.1). If no zones are selected, the call is automatically distributed to all zones. When the PTT button is pressed:

- The red *EMG mic* indicator on the front of the controller is turned ON (see figure 6.15).
- If they are currently being distributed, the default alert and alarm messages are stopped (to activate an alert message, see section 6.8, to activate an alarm message, see section 6.9).

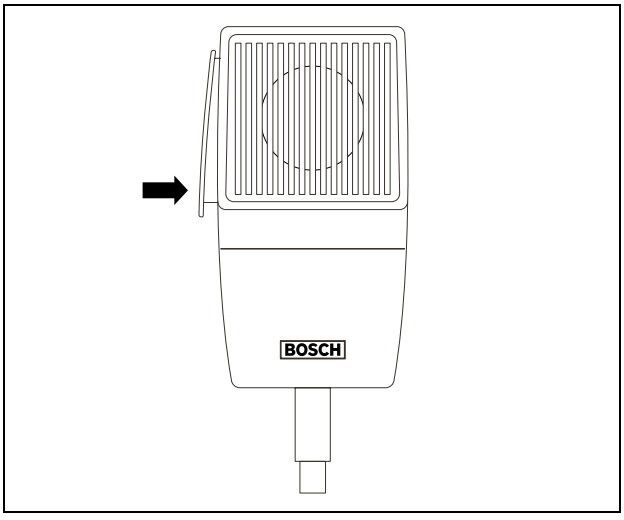

figure 6.14: EMG microphone: PTT button

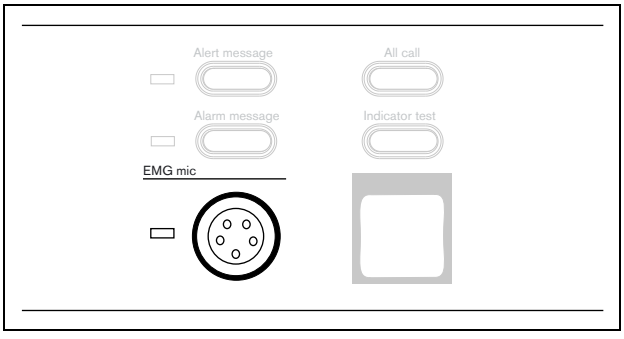

figure 6.15: EMG microphone indicator

Note
If the *Alarm/Alert message* button is pressed, the live speech from the call stations is overruled by the alarm/alert message.

6.8 Alert messages

Proceed as follows to distribute the prerecorded alert message:

1 Enter the emergency state (see section 6.6.1).
2 Select one or more zones (see section 6.7.1).
3 Start the alert message (see section 6.8.1).
4 Exit the emergency state (see section 6.6.3).

6.8.1 Starting the alert message

Press the *Alert message* (toggle) button to start the alert message (see figure 6.16). Note that the green LED next to the button is turned ON. The message is only distributed to the selected zones (see section 6.7.1). To stop the alert message, press the *Alert message* button again. Note that the green LED next to the button is turned OFF.

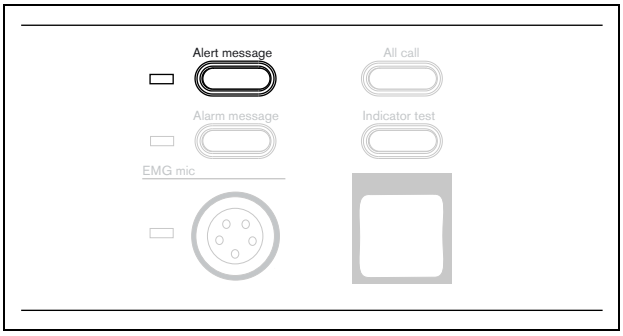

figure 6.16: Alert message button and indicator

Note
If the *Alarm message* button is pressed, while the alert message is playing, the alert message is overruled by the alarm message.

6.9 Alarm messages

Proceed as follows to distribute the prerecorded alarm message:

1 Enter the emergency state (see section 6.6.1).
2 Select one or more zones (see section 6.7.1).
3 Start the alarm message (see section 6.9.1).
4 Exit the emergency state (see section 6.6.3).

6.9.1 Starting the alarm message

Press the *Alert message* (toggle) button to start the alert message (see figure 6.16). Note that the green LED next to the button is turned ON. The message is only distributed to the selected zones (see section 6.7.1). To stop the alert message, press the *Alert message* button again. Note that the green LED next to the button is turned OFF.

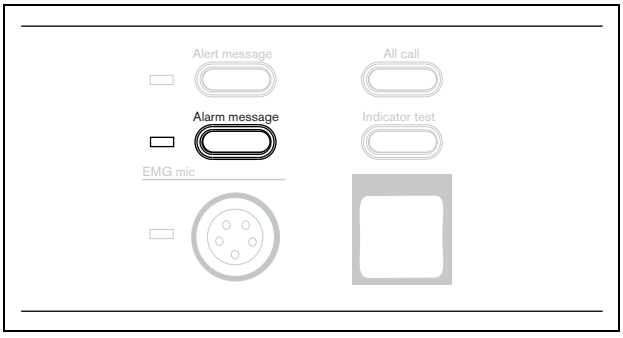

figure 6.17: Alarm message button and indicator

Note
If the *PTT* button on the EMG microphone is pressed, while the alarm message is playing, the alarm message is overruled by the live speech.

7 Fault Handling

7.1 Introduction

In accordance with IEC60849, the international evacuation and emergency standard, a number of functions of a Plena voice alarm system, are supervised. If supervision is enabled (see section 5.3.3) and a supervised function fails, the voice alarm controller enters the fault state. When entering the fault state, the following events are simultaneously initiated:

- The controller's integrated beeper starts.
- The fault contact is activated (see also section 4.12.2).
- A LED on the front of the controller, indicating the fault, is turned ON.

To troubleshoot a fault, see section 7.3.

7.2 Fault indicators

Two categories of faults are indicated:

- Line faults (see section 7.2.1).
- System faults (see section 7.2.2).

7.2.1 Line fault indicators

The line fault indicators provide information about failing loudspeaker lines. A controller and a router, each have their own line fault indicators. Each loudspeaker line is supervised on short-circuits, line impedance and short-to-grounds (see section 5.3.3.5). If a line fault indicator is turned ON, check the wiring of the indicated loudspeaker line and try to solve the fault. If it not possible to determine the fault, contact your dealer.

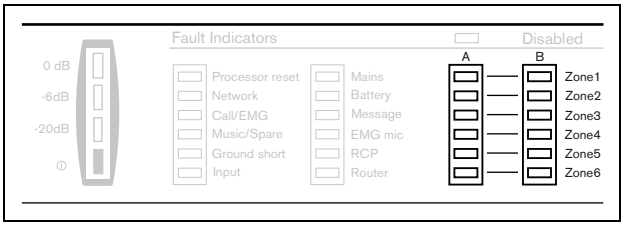

figure 7.1: Line fault indicators

7.2.2 System fault indicators

The system fault indicators provide information about failing system functions that are supervised (see table 7.1). A controller and a router, each have their own system fault indicators. However, some system faults are not applicable to a router, and therefore do not have an associated fault indicator on the router. If a system fault indicator is turned ON, consult table 7.1 for a suitable remedy. If a system fault is persistent, contact your dealer.

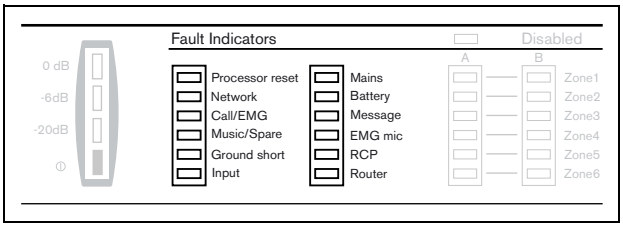

figure 7.2: System fault indicators

7.2.3 Supervision disabled

If supervision is disabled (see section 4.5), the fault indicators do not function and the *Disabled* indicator is turned ON (see figure 7.3).

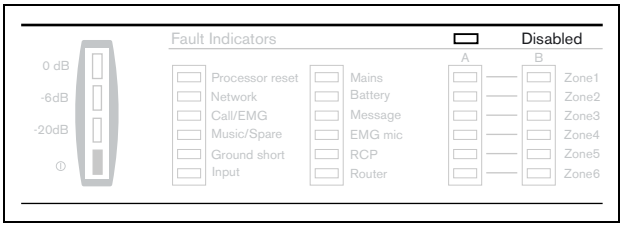

figure 7.3: Disabled indicator

7.2.4 Indicator test

Press the *Indicator test* button to test the availability of all indicator LEDs.

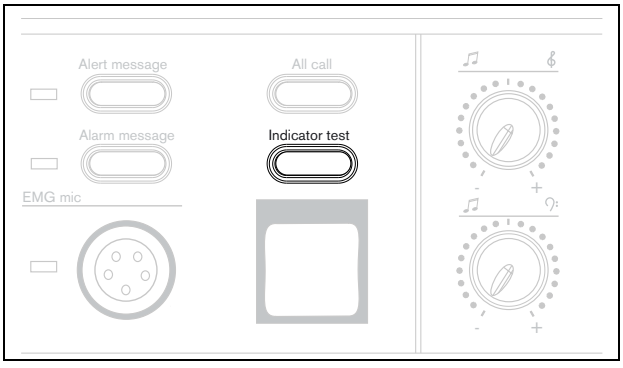

figure 7.4: Indicator test button

7.3 Troubleshooting a fault

To troubleshoot a fault, follow the next steps:

1 Press the *Fault Ack* button to acknowledge the fault (see figure 7.5). The beeper is switched OFF.

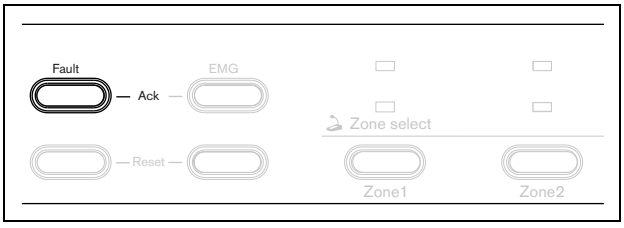

figure 7.5: Fault Ackowledge button

2 Solve the fault. To solve a line fault, see section 7.2.1. To solve a system fault, consult table 7.1.
3 Press the *Fault Reset* button to reset the fault (see figure 7.6). The fault LED is switched OFF.

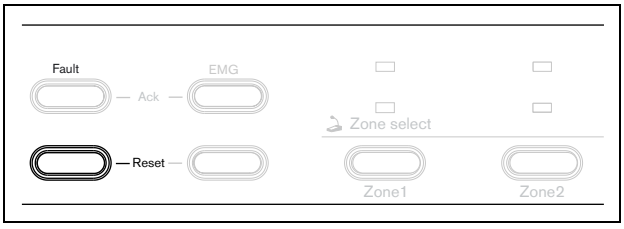

figure 7.6: Fault Reset button

If the *Fault Reset* button is pressed, the detected fault is checked immediately. If the fault is still present, the corresponding fault LED will turn ON again and the system will remaind in the fault state.

7.4 System faults

table 7.1: System fault indicators

Indicator	Description	Recommended action	Additional information
Processor reset	A processor reset is detected.	Switch the voice alarm controller off and on again.	See section 5.3.3.2.
Network	A network fault is detected.	Contact your dealer.	This fault should not occur, since this type of supervision is disabled (see section 5.3.3.3)
Call/EMG	In 1-channel mode: The internal booster (i.e. the call booster) of the voice alarm controller failed. In 2-channel mode: The external booster (i.e. the call booster) failed.	In 1-channel mode: Switch the voice alarm controller off and on again. In 2-channel mode: Switch the external booster off and on again.	See section 5.3.4 and section 4.15.3.
Music/Spare	In 1-channel mode: The external booster (i.e. the spare booster) failed. In 2-channel mode: The internal booster (i.e. the BGM booster) failed.	In 1-channel mode: Switch the external booster off and on again. In 2- channel mode: Switch the voice alarm controller off and on again.	See section 5.3.4 and section 4.15.3.
Ground short	A short-to-ground fault in the loudspeaker line cabling is detected.	Check all loudspeaker lines for short-to-ground situations.	See section 4.8 and section 5.3.3.5
Input	An input contact fault is detected.	Contact your dealer.	This fault should not occur, since this type of supervision is disabled (see section 5.3.3.7).
Mains	A mains power failure is detected.	Check the mains power connection of the voice alarm controller and the mains power availability.	See section 4.15.1 and section 5.3.3.8.
Battery	A back-up power failure is detected.	Check the back-up power supply connection of the voice alarm controller and the back-up power availability.	See section 4.15.2 and section 5.3.3.9.
Message	A message fault is detected.	Switch the voice alarm controller off and on again.	See section 5.3.3.4.
EMG mic	A emergency microphone fault is detected.	Check the emergency microphone. If necessary, replace it.	See section 4.13 and section 5.3.3.6.

table 7.1: System fault indicators

RCP	A remote control panel fault is detected.	Contact your dealer.	This fault should not occur, since this type of supervision is disabled (see section 5.3.3).
Router	A router fault is detected.	Contact your dealer.	This fault should not occur, since this type of supervision is disabled (see section 5.3.3).

8 Technical Data

8.1 Call Station LBB1956/00

8.1.1 Electrical

Voltage range:
24 V(DC), +20%/-10%, supplied by LBB1990/00 or external power source.
Current consumption:
< 30 mA

8.1.2 Performance

Nominal sensitivity:
85 dB SPL (gain preset 0 dB)
Nominal output level:
355 mV
Maximum input sound level:
110 dB SPL
Gain preset:
+6/0/-15 dB
Limiter threshold:
2 V
Compression ratio limiter:
20:1
Distortion:
< 0.6% (nominal input)
< 5% (maximum input)
Equivalent input noise level:
25 dB SPL(A)
Frequency response:
100 Hz - 16 kHz
Speech filter:
- 3 dB @ 500 Hz, high-pass, 6 dB/oct
Output impedance:
200 Ω

8.1.3 Interconnection

Type:
2x redundant RJ45 sockets to connect the call station to the voice alarm controller with Cat-5 Ethernet cables.

8.1.4 Environmental conditions

Operating temperature range:
-10 to +55 °C
Storage temperature range:
-40 to +70 °C
Relative humidity:
< 95%

8.1.5 General

EMC emission:
According to EN55103-1
EMC immunity:
According to EN55103-2
Dimensions:
40 x 100 x 235 (base)
390 mm stem length (with microphone)
Weight:
approx. 1 kg

8.2 Voice Alarm Controller LBB1990/00

8.2.1 Electrical

Mains voltage:
230/115 V(AC), ± 15%, 50/60 Hz
Max. mains power consumption:
760 VA
Battery voltage:
24 V(DC), +20%/-10%
Max. battery current:
25 A
Max. mains inrush current:
6.3 A (for mains voltage of 220 - 240 V)
10 A (for mains voltage of 100 - 120 V)

8.2.2 Message manager

Data format:
WAV-file, 16-bit PCM, mono
Supported sample rates (fs):
24 kHz, 22.05 kHz, 16 kHz,
12 kHz, 11.025 kHz, 8 kHz
Frequency response:
@ fs = 24 kHz, 100 Hz - 11 kHz (+1/-3 dB)
@ fs = 22.05 kHz, 100 Hz - 10 kHz (+1/-3 dB)
@ fs = 16 kHz, 100 Hz - 7.3 kHz (+1/- 3 dB)
@ fs = 12 kHz, 100 Hz - 5.5 kHz (+1/-3 dB)
@ fs = 11.025 kHz, 100 Hz - 5 kHz (+1/-3 dB)
@ fs = 8 kHz, 100 Hz - 3.6 kHz (+1/-3 dB)
Distortion:
< 0.1% @ 1 kHz
Signal-to-noise ratio (flat at max. volume):
> 80 dB
Memory capacity:
64 Mbit EEPROM
Recording/playback time:
500 s @ fs = 8 kHz to 167 s @ fs = 24 kHz
Number of messages:
max. 255 wave files
Supervision EEPROM:
continuous checksum control
Supervision DAC:
1 Hz pilot tone
Data retention time:
> 10 years

8.2.3 Internal booster

Rated output power:
240 W
Frequency response:
50 Hz - 20 kHz (+1/-3 dB, @ -10 dB ref. rated output)
Distortion:
< 1% @ rated output power, 1 kHz
Signal-to-noise ratio (flat at max. volume):
> 85 dB
Supervision:
20 kHz pilot tone
Outputs:
70, 100 V screw terminal, 100 V call out

8.2.4 Interconnection

Call Station (LBB1956):
Redundant RJ45 sockets, CAN bus
max. 8 call stations
Voice Alarm Router (LBB1992):
RJ45 socket, CAN bus
max. 2 routers
PC:
USB 2.0 (USB 1.1 compatible)
External booster
3-pin XLR and screw terminals, max. 5 A
max. rated output 480 W

8.2.5 Loudspeaker outputs

Type:
Screw terminals
Number of zones:
6
Number of loudspeaker lines:
12 (2 per zone)
Signal-to-noise ratio (flat at max. volume):
> 85 dB
Line voltage:
100 V

8.2.6 Overrides

Type:
3-wire or 4-wire on screw terminals
Voltage:
24 V(DC) for 4-wire, if selected
Current:
max. 0.8 A

8.2.7 Trigger outputs

Type:
Screw terminals
Voltage:
Floating, max. 250 V
Current:
max. 0.5 A

8.2.8 Trigger inputs/24 V DC out

Trigger voltage:
< 24 V
Type
Momentary or latching
Normally opened (default) or normally closed
Emergency input supervision:
10 kΩ + 10 kΩ series and parallel resistors
24 V DC out:
24 V(DC)
VOX switch:
Normally opened

8.2.9 VOX input

Type:
3-pin XLR, 6.3 mm jack socket, balanced
Sensitivity:
1 mV +1/-3 dB (mic), 1 V +1/-3 dB (line)
Impedance:
> 10 kΩ
VOX threshold:
100 µV (mic), 100 mV (line)

8.2.10 BGM

Type:
Cinch, stereo converted to mono
Nominal input level:
200 mV - 2 V

8.2.11 Line out

Type:
3-pin XLR, 6.3 mm jack socket, balanced
Nominal output level:
1 V
Maximum output level:
2 V

8.2.12 External booster

Type:
3-pin XLR and screw terminals
Controller output/External booster input voltage:
1 V
Controller input/External booster output voltage:
100 V

8.2.13 Environmental conditions

Operating temperature range:
-10 to +55 °C
Storage temperature range:
-40 to +70 °C
Relative humidity:
< 95%

8.2.14 General

EMC emission:
According to EN55103-1
EMC immunity:
According to EN55103-2
Dimensions:
19” wide, 3 U high
19” mounting brackets:
included
Weight:
approx. 20 kg

8.3 Router LBB1992/00

????more to come???

9 Glossary

A

Acknowledge
Faults and EMG triggers should first be manually acknowledged before they can be reset. The Fault/EMG Acknowledge buttons are located on the front of the controller.

Alarm message
A prerecorded digital alarm message can be broadcast to one or more zones or zone groups.

Alert message
A prerecorded digital alert message can be broadcast to one or more zones or zone groups.

APR
Asian Pacific Region. In APR mode the controller is configured to operate in the Asian Pacific Region, and as such, adapted to the local emergency standards.

AUX
Instead of a CD/Tuner, an auxiliary audio input can be connected to the controller.

B

BGM
Background Music (CD/Tuner/AUX) can be broadcast to all zones, or only to a selected number of zones (or zone groups).

Booster
The controller is equipped with a 240 W internal booster, which can be used in 1- or 2-channel mode. In 2-channel mode, an external booster is required. In 1-channel mode, an external booster may optionally be connected to function as a spare booster.

Business call
Live announcement that is made when the system is in the normal state. Business calls can be made from a call station (LBB1956/00).

C

Calibration
If supervision is enabled, the controller measures at regular intervals, the impedance of the loudspeaker lines. The measured values are compared with the reference calibration values. Calibration values can be measured and stored by pressing the *Calibration* button on the back of the controller.

CAN
Protocol used for serial communications between the controller, the call stations, the routers and the RCPs.

CAT-5
A category-5 cable is designed to have a nominal characteristic impedance of 100 Ohms. Each twisted cable pair in the cable, is twisted 5 times per inch. The cable allows for high-speed data transmissions.

1/2-Channel mode
In 1-channel mode, the internal booster amplifies calls and BGM. In 2-channel mode, the internal booster amplifies the BGM. Calls are amplified by an external booster.

Chime
A chime is a prerecorded message. Pre- and/or post chimes can be added to live spoken messages or to emergency messages.

Call station
A call station is used to make business calls. At maximum 8 call stations can be directly connected to the controller.

D

dB
A logarithmic unit of sound intensity.

DC
Direct Current or constant voltage source.

E

Emergency call
Emergency calls can only be distributed in the emergency state, using the emergency microphone. This emergency state is entered by pressing the red emergency button on the front of the controller.

EMG
Emergency. The Plena Voice Alarm System conforms to the emergency requirements as specified in the international IEC60849 standard. The emergency state is entered when the EMG button is pressed or when an EMG trigger input is activated.

EVAC
Evacuation Voice Alarm Controller.

F

Fault state

If a supervised function fails, the system automatically enters the fault state. The integrated beeper starts, the fault contact is activated and the corresponding LED on the front of the controller is turned ON.

Fireman's control panel

The controller provides a CAN interface (9-pin D sub connector) for the connection of a remote fireman's control panel.

Firmware

The firmware of a controller and a router can be upgraded with the latest version via the PC.

I

IEC60849

The Plena Voice Alarm System is compliant with the international standard IEC60648, which describes evacuation standards applicable to emergency systems.

Firmware

The firmware of a controller and a router can be upgraded with the latest version via the PC.

L

LED

Light Emitting Diode's are used on the frontside of the controller/Router for indication purposes.

Line fault

A fault in a loudspeaker line (A or B) is indicated by the corresponding LED on the frontside of the controller/Router. All loudspeaker lines are supervised.

M

Message manager

The message manager is integrated in the controller and manages all prerecorded chimes and messages as one central audio source.

Monitoring

A build-in loudspeaker on the front of the controller, can be used to monitor the Plena Voice Alarm System. Use the Monitor DIP switch on the rearside of the controller, to enable the monitoring loudspeaker.

P

PA system

Public Address system.

PC

A Personal Computer, running the Configuration Software, is used to configure a Plena Voice Alarm System. The PC is connected to the controller, via a USB connection.

Phantom power

A DC voltage to supply a VOX microphone with, if required. A DIP switch on the rearside of the controller switches the phantom power ON or OFF.

Plena Voice Alarm System

IEC60648 compliant PA/EMG Voice Alarm System, developed by Bosch Security Systems, suitable for mid-range applications. The complete PA/EMG Voice Alarm System comprising a controller, one or more call stations, optionally one or more routers and other optional Plena equipment, serving one or more loudspeaker zones.

Praesideo

IEC60648 compliant PA/EMG Voice Alarm System, developed by Bosch Security Systems, suitable for mid-range applications.

Priority

Various input sources can be assigned a priority. Higher priority input sources will overrule simultaneously active lower priority input sources.

PTT

A PTT (Push To Talk) button (the big button on a call station) can be used to activate a call station's microphone in order to make a spoken message.

R

RJ45

RJ45 connectors are provided at the rearside of the controller, for the connection of the call station(s) and the router(s).

RCP

A Remote Control Panel can be connected to the controller to provide similar functionality on a remote location. RJ45 connectors are used to connect the RCP and the controller, over an RS-485 CAN interface. The BGM of the controller is digitally transferred to the RCP.

Reset
Faults and EMG triggers should first be manually acknowledged before they can be reset. The Fault/EMG Reset button is located on the frontside of the controller.

Router
A router (LBB1992/00) can be used to extend the total number of zones. In total 6 routers can be connected. Each router adds 6 extra speaker zones, thus a Plena Voice Alarm System can manage 60 zones in total.

RS-232
Asynchronous interface protocol for point-to-point communications, between the controller and an event logger. Each cable end is provided with a 9-pin D sub connector.

RS-485
Serial interface protocol over twisted pair cables for multipoint master/slave communications within the Plena Voice Alarm System. Each cable end is provided with an RJ45 connector.

S

Supervision
In compliance with the international standard IEC60849, various functions in the Plena Voice Alarm System are supervised. Any failing function will illuminate the corresponding LED on the frontside of the controller/router. Supervision can be switched OFF by setting the Supervision DIP switch on the rearside of the controller to OFF.

System fault
A system fault is the Plena Voice Alarm System is indicated by the corresponding LED on the frontside of the controller/Router. All relevant system functions are supervised.

T

Trigger input
The rearside of the controller provides 6 EMG and 6 business trigger inputs. All inputs can be used to signal events to the controller. However, the EMG inputs have a higher priority range than the business inputs.

U

USB
Universal Serial Bus, used for communications between the controller and a PC.

V

Controller
The voice alarm controller is the heart of a Plena Voice Alarm System. The controller, a digital network controller, manages all incoming spoken messages from the call stations, all EMG messages, whether live spoken or prerecorded, and directs them to the correct speaker zones.

VOX
The controller has one mic/line input with VOX (voice-activated) functionality. The input can be used to connect an additional emergency microphone or to interface with another emergency sound system (e.g. a Praesideo system). A VOX microphone is always ready-to-transmit enabling handsfree applications.

VU
A VU meter, or Volume Unit meter. The 4-LED colored bar in the upper left corner on the front of the controller indicates the sound level (in dB) of calls and BGM.

W

WAV
Sound file format used to store prerecorded (alarm and alert) messages in the controller. The properties of used .wav-files should adhere to:
8 KHz < sampling frequency < 24 KHz; 16-bit; mono.

Z

Zone
A loudspeaker zone or functional PA/EMG zone. Each zone can be individually addressed by the controller.
Zone group
A group of zones. The user can configure any combination of zones into zone groups. Each zone group can be individually addressed by the controller.

For more information visit
www.boschsecuritysystems.com

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